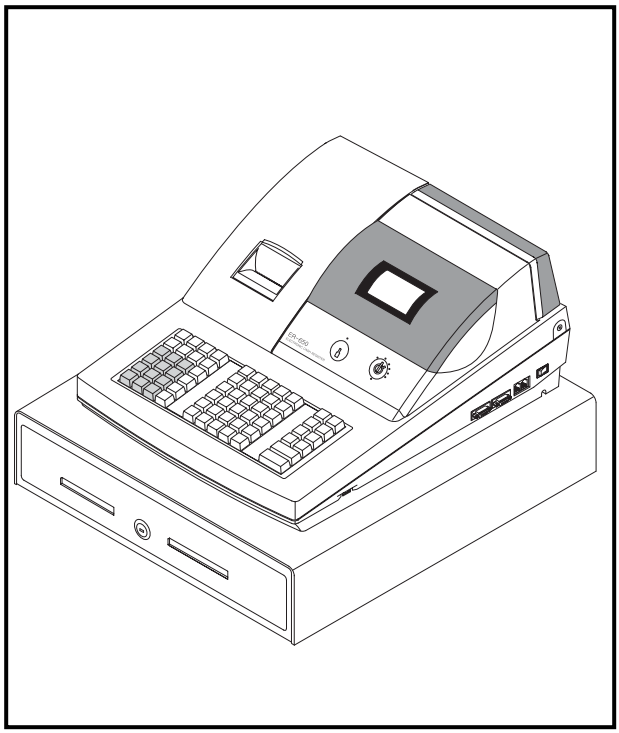
SAM4S

ELECTRONIC CASH REGISTER

ER-650 / 650R

SERVICE Manual

ELECTRONIC CASH REGISTER



C O N T E N T S

1. Precaution Statements
2. Product Specifications
3. Installation and Operation
4. Assembly and Disassembly
5. Maintenance Adjustment
6. Exploded View and Part List
7. PBA Layout and Part List
8. Trouble Shooting
9. Block diagram
10. Wiring Diagram
11. Schematic Diagram

Overview of this ECR

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact our service branch or R&D center. Schematics and specifications provide the needed information for the accurate troubleshooting.

All information in this manual is subject to change without prior notice. Therefore, you must check the correspondence of your manual with your machine. No part of this manual may be copied or reproduced in any form or by any means, without the prior written consent of Shin Heung Precision .

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered on in the REG mode for at least twenty-four hours. This allows the Ni-MH battery, which maintains the memory of the ECR while the power is off, to charge completely.

"Proper disposal of batteries is required. Refer to your local codes for disposal requirements."

About this Manual

This service manual describes how to perform hardware service maintenance for the SAM4S ER-650/R Series Electronic Cash Register.

Notes

Notes may appear anywhere in the manual. They describe additional information about the item.

Precaution symbols

⚠. Indicates a Safety Precaution that applies to this part component.

⚠. Indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

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SAM4S ER-650/R SERIES

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1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages.
   Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Design Alteration Warning:
   Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
5. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over- heating, and correct any potential hazards.
6. Observe the original lead dress, especially near the following areas : sharp edges, and especially the AC and high voltage supplies.
   Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.
7. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection.
   These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.

   Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚠). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

CAUTION

Dangerous explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose used batteries according to the manufacturer's instructions.

ATTENTION

ll y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.

Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

1-2 Servicing Precautions

WARNING: First read the-Safety Precautions-section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

WARNING: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the units AC power cord from the AC power source before attempting to:
   (a) Remove or reinstall any component or assembly
   (b) Disconnect an electrical plug or connector
   (c) Connect a test component in parallel with an electrolytic capacitor
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples metal panels and input terminals).
6. Insulation Checking Procedure:
   Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of AC plug.

   The insulation resistances between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 Mega Ohm.
7. Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect an instrument's ground lead to the instrument chassis ground before connecting the positive lead ; always remove the instrument's ground lead last.

1-3 Precautions for Electrostatic Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatic Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use Freon-Propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothe together, or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

2 Product Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 General Specifications

Item	Description	Remark
Processor	• MITSUBISHI M16C/62 Group M30622SFP (16 Bit)	External ROM Version
Memory	• RAM SRAM (K6T1008C2E) : 1Mbits × 2EA SRAM (K6T4008C1C) : 4Mbits × 2EA(Option) • EP-ROM ER-ROM(27C040) : 4Mbits	
Battery	• Type : Ni-MH, 3.6V 70mAh • Charging Time : 24 Hours • Life : 3 Years	
Data Storage	• 60 Days	When battery is Full charged
Interface Serial (RS-232C)	• Flow Control : ① DTR / DSR : H/W Flow Control ② XON / XOFF : S/W Flow Control • Baud Rate : 4800 / 9600 / 19200 Bps • Connector : DB9P Female (I/F PBA)	RS-232C #1 RS-232C #2
Interface Serial (IRC)	• Flow Control : ① XON/XOFF : S/W Flow Control • Baud Rate : 9600 Bps • Connector : Modular Jack Connector 12Pin (2 Port-6Pin)	Same as RS-485 2-Wire Communication Method
Printer	• Model : STM-210 • Printing Speed : 50mm(13.3 Lines) / Sec	Detail Spec refer to Next Page
Display	• Operator Display : LCD (128 × 64 Dots) • Customer Display : VFD (10 Digits)	
Key Board	• Raised Key : 78 Key • Flat Rubber Key : 98 Key	
Power Consumption	• Approx. 15W (Regularity), Approx. 28W (Peak)	
Power Requirement	• AC 120V 60Hz, 230V 50Hz	
Environment Condition	• Temperature : 0℃ ~ 45℃ • humidity : 30% ~ 80% RH	
Weight	• 13.7 Kg (SET), 15.8Kg (Box Packing)	
Dimensions(mm)	• 400(W) × 450(D) × 282.7(H)	

Table2-1 General Specifications

2-2 Appearance

2-2 A. Appearance Dimensions (mm)

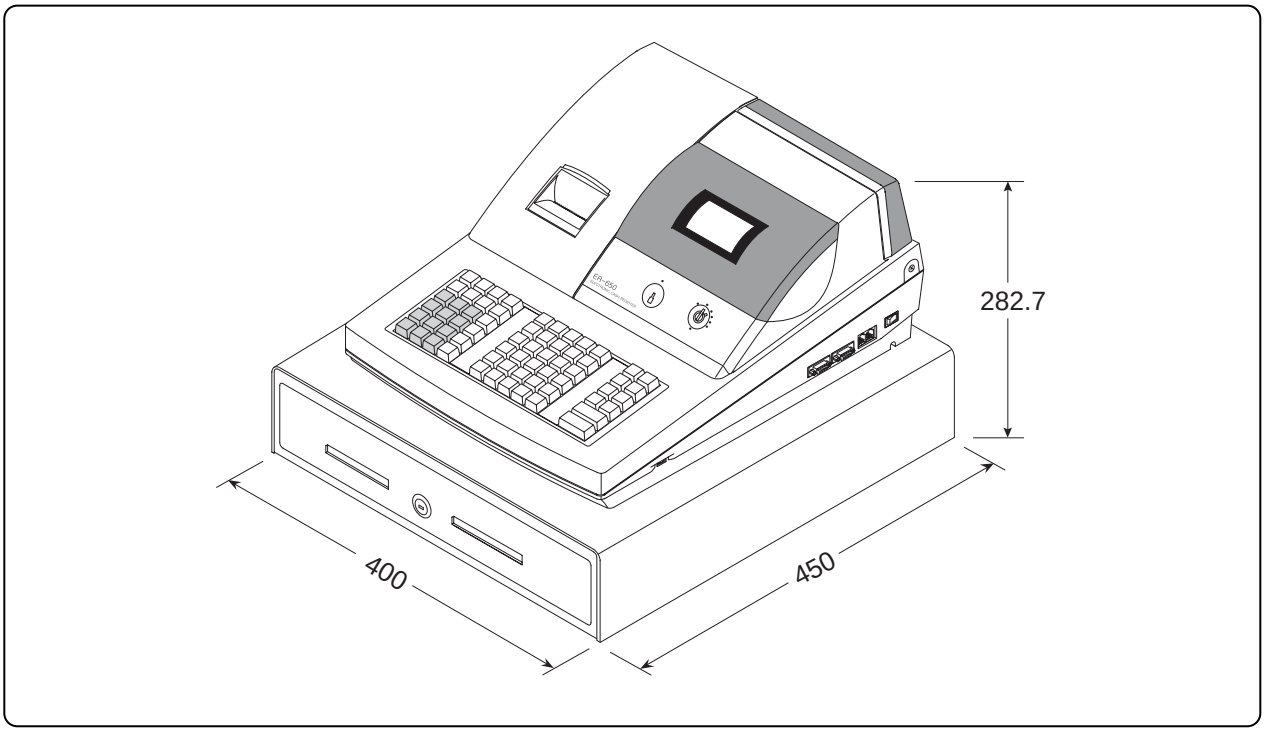


Figure2-1 Dimensions

2-2 B. Feature Locations

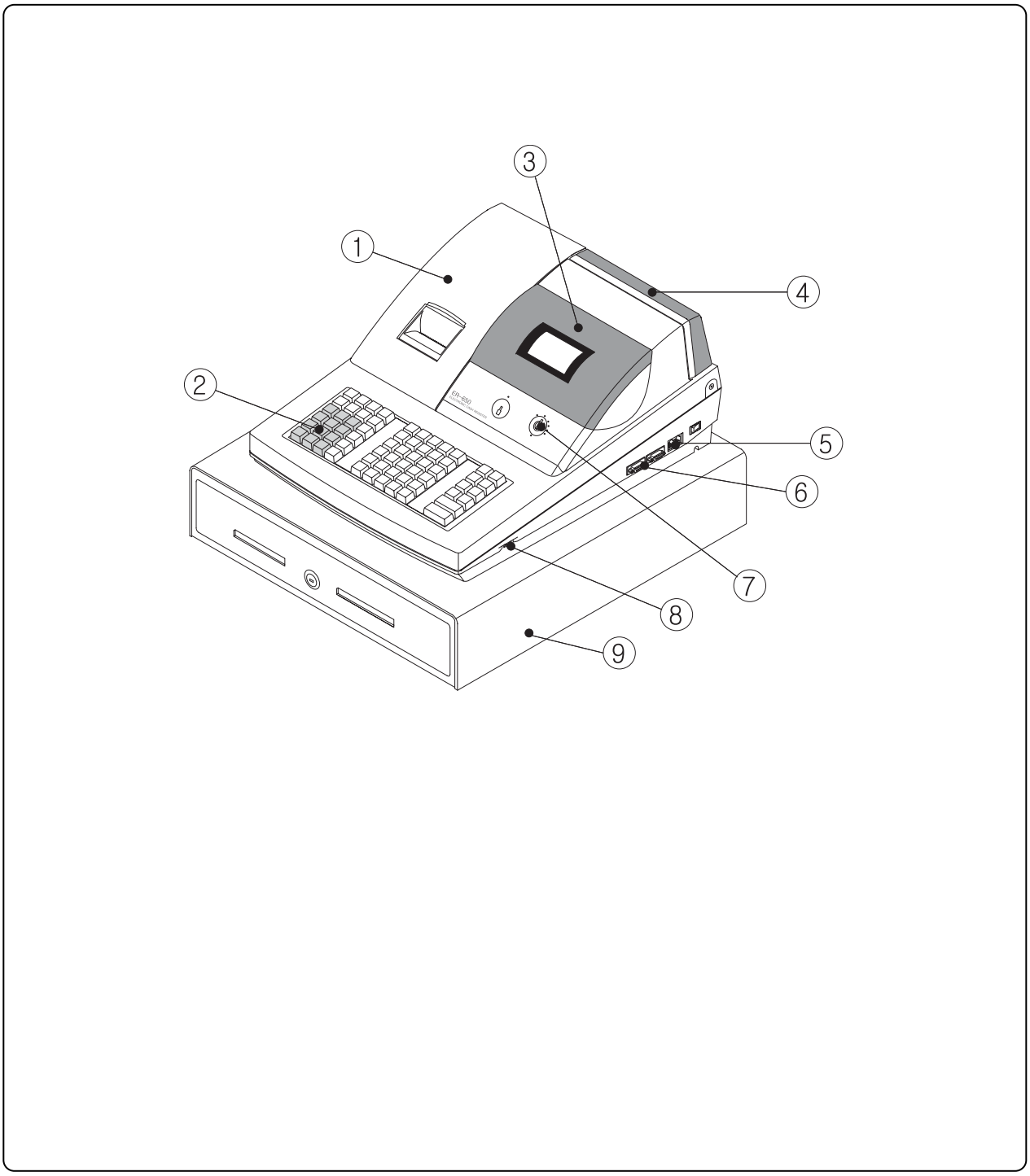


Figure2-2 Feature Locations

2-3 Thermal Printer Specifications

2-3 A. Printer Specification

Item		Description	Remark
Model		• STM-210	
Print Method		• Thermal Line Printing	
Printing Format	Total number of dots	• 384 Dots / I Line	
	Dot Pitch	• Vertical : 0.125 mm • Horizontal : 0.125 mm	
Printing Speed		• 50 mm/s (At 8.5V of Motor Terminal Voltage)	
Printing Direction		• Unidirection with friction feed	
Paper Feeding	Feeding Method	• Friction Feed	
	Minimum Feed Pitch	• 0.0625 mm	
	Feeding Speed	• 50 mm/s (At 8.5V of Motor Terminal Voltage)	
Power Supply Volt	Power Voltage	• 8V / 8.5V (Recommend)	Head/Motor
	Circuit input Voltage	• 5V	Head Control/Sensor
Printer Head	Heat Element Density	• 8 Dots/mm (0.125 mm/Dot)	
	Total Head Elements	• 384 Dots/Dot Line	
	Available Printing Width	• 48 mm	
	Heat element typical Ω	• 176 Ω ±4%	
Motor	Paper Feed Motor	• 4-Phase Bi-Polar Stepping Motor	
Sensor	Head Temperature	• Thermister	
	Paper-End Sensor	• Reflecting Photo Sensor	
	Cover Open Sensor	• Micro Switch	
Reliability	Life	• 15,000,000 Lines	
	MCBF	• 37,000,000 Line	
Dimension (mm)		• 82.5 (W) ×147.3 (D) ×101.4 (H)	
Weight		• Approx. 365 g	

Table2-2 Thermal Printer Specifications

2-3 Thermal Printer Specifications

2-3 B. Paper Specification

Item	Description	Remark
Paper Type	• Single-ply Thermal Paper Roll	
Paper Size	• 57.5 mm ± 0.5 mm (Width) ×80 mm or less	
Specified Paper	• Original Paper No.	

Table2-3 Paper Specification

Note: The following paper can be used instead of the specified paper above.

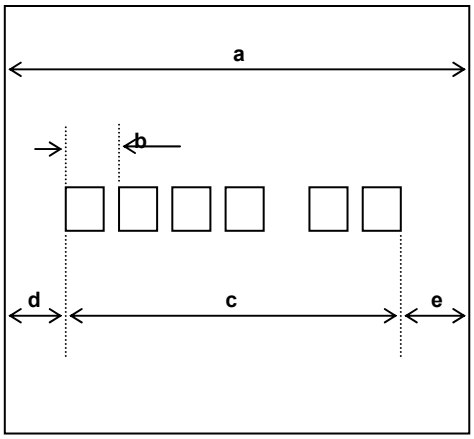
TF50KS-E : Nippon paper industries Co.,Ltd.

PD 160R : New Oji paper Mfg, Co.,Ltd.

F380 : Kansaki specialty papers, Inc. (USA)

2-3 C. Printable Area

The Printable area of a paper with width of 80-1.0mm(3.13”±0.02”) is 72.2±0.2mm(2.84””±0.008”)(512 dots) and the space on the right and left sides are approximately 3.7mm(0.146”).



a = 57.5±0.5 mm (Paper Width)

b = 1.mm (1 Char.

c = 48 mm (384 Dots/Printable Area)

d = 4.75 mm (Left Space)

e = 4.75 mm (Right Space)

Figure2-3 Printable Area

2-3 D. Character Specification

Item	Description	Remark
Character Structure	• 12(W) × 24(H) Font (Including a horizontal spacing)	
Character Size	• 1.25 mm(W) ×3.0 mm(H)	
Column Pitch	• 1.5 mm	
Line Pitch	• 3.75 mm (Including 6-dot line spacing)	
Number of Column	• 32 (12×24 Font/Character)	

Table2-4 Character Specification

2-3 Thermal Printer Specifications

2-3 E. Other Component Specification

Item		Description	Remark
Paper Feed Motor	Type	• 4-Phase 20 Step PM Stepping Motor	
	Power Supply Voltage	• 8V ~ 8.5V DC	
	Coil Resistance	• 20 Ω ±1.4Ω (25℃/Phase)	
	Current Consumption	• Peak : 2A or less • Mean : Approx. 350 mA	
	Drive Method	• Constant-Voltage Driving using 2-2 Phase Excitation	
Printer Head	Number of Heat Element	• 384 Dots	
	Heat Element Density	• 8 Dots/mm (0.125 mm/Dot)	
	Typical Resistance Value	• 176 Ω ±4%	
	Current	• Approx. 3.1 A	
Thermister	Constant B	• 3950K ±2%	
	Resistance Value	• 30kΩ ±5% (25℃)	
	Temperature Character	• Rt=R(25)×Exp[B×{1/(T+273)-1/(25+273)}]	
	Operating Temperature	• -20℃ ~ 80℃	
Paper End Sensor	Type	• Reflecting Photo Sensor	
	Spec	• SG-2BC (Kodenshi corp.)	
Cover Open Sensor	Type	• Micro Switch	
	Supply Voltage	• 5 VDC±5%	
	Current Rating	• 1A ~ 50 mA	
	Detect Method	• On when the printer head is load	

Table2-5 Other Component Specification

2-3 F. Printer Connector

2-3 F-(a) Cover Open Sensor Pin Assignments

Pin No.	Signal Description	Remark
1	VCC	
2	GND	

Table2-6 Printer Pin Assignment

2-3 Thermal Printer Specifications

2-3 F-(b) Paper Feed Motor Pin Assignments

Pin No.	Signal Description	Remark
1	Phase B	
2	Phase B-	
3	Phase A	
4	Phase A_	

2-3 F-(c) Paper-End Sensor Pin Assignments

Pin No.	Signal Description	Remark
1	GND	
2	Paper End Signal	
3	VCC	

2-3 F-(d) Thermal Head Connector Pin Assignments

Pin No.	Signal Description	Remark
1	VH	
2	VH	
3	D0	
4	/LAT	
5	GND	
6	GND	
7	STB1	
8	STB2	
9	STB3	
10	TM	
11	TM	
12	VCC	
13	STB4	
14	STB5	
15	STB6	
16	GND	
17	GND	
18	CLK	
19	DI	
20	VH	
21	VH	

2-4 Power Specifications

2-4 A. Power Specification

Item	Description	Remark
Input Voltage & Current	• U.S.A : AC 120V, 150mA, 60Hz (Min : 90V, Max : 132V) • Europe : AC 230V, 80mA, 50Hz (Min : 198V, Max : 264V)	
Power Consumption	• Stand-By : 10W • Operating : 15W	
Output Voltage	• AC 19V 2.3A (Wire Color : Blue-Blue) • AC 24V 0.15A (Wire Color : Red-Red)	Power Transformer Output

Table2-7 Power Specification

2-5 Interface Specifications

2-5 A. RS-232C Serial Interface

2-5 A-(a) Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
Hand Shaking (Flow Control)	• H/W : DTR / DSR • S/W : XON / XOFF	XON : ASC Code 11h XOFF : ASC Code 13h
Signal Level	• Logic"1" (MARK) : -3V ~ -15V • Logic"0" (SPACE) : +3V ~ +15V	
Baud Rate	• 1200 / 2400 / 4800 / 9600 / 19200 bps	
Data Word Length	• 7 Bit / 8 Bit	
Parity	• None / Even / Odd	
Connector	• DB9P Female (I/F PBA Side)	
Voltage Supply	• VCC(+5V/200mA) is supplied at 9Pin of D-SUB Connector.	For Bar Code Reader or other devices

Table2-18 RS-232C Specification

2-5 A-(b) RS-232C I/F Cable

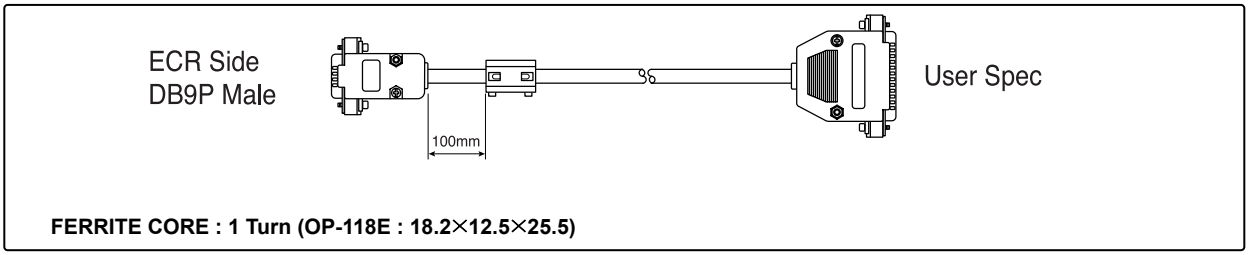


Figure2-4 RS-232C Cable

2-5 A-(c) Cable Connection

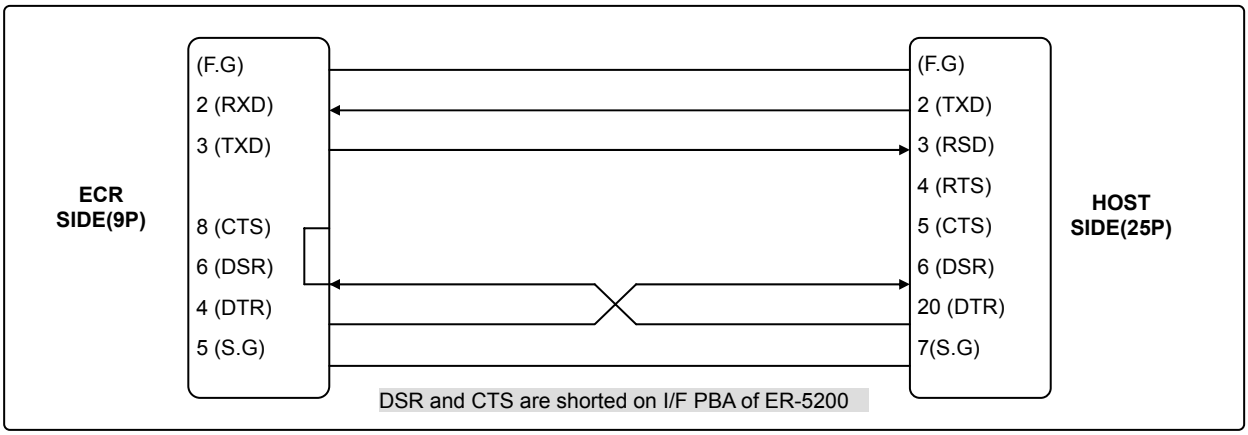


Figure2-5 RS232C Cable Connection

2-5 Interface Specifications

2-5 A. RS-232C Serial Interface

2-5 A-(d) Signal Description

Pin No.	Signal Name	Signal Direction	Function
BODY	Frame GND	-	Frame Ground
2	RXD	Input	Receive Data
3	TXD	Output	Transmit Data
4	DTR	Output	This Signal indicates whether the ECR(ER-5200) is busy. (H/W flow control) ① MARK(Logic1) : The ECR is busy ② SPACE(Logic0) : The ECR is not busy ③ The host transmits a data to the ECR, after confirming this signal. ④ When XON/XOFF flow control is selected, the host does not check this signal.
5	Signal GND	-	Signal Ground
6	DSR	Input	This signal indicates whether the host computer or receipt printer can receive data. (H/W flow control) ① MARK(Logic1) : The host can receive a data. ② SPACE(Logic0) : The host can not receive a data ③ The ECR transmits a data to the host or receipt printer, after confirming this signal. ④ When XON/XOFF flow control is selected, the printer does not check this signal.
9	VCC	Output	VCC(+5V/200mA) is supplied at 9Pin of D-SUB Connector.

Table2-19 RS-232C Signal Description

Caution: The VCC is supplied for the barcode or other devices power source. The Supply Current 200mA is total value including COM1 and COM2 Power Consumption. If the Total Power Consumption of the attached devices is exceeded the specification (200mA), the system cut the VCC of D-SUB Connector. Then, the attached devices do not work and It is possible that the ECR is damaged.

Caution: If the device with 5V/200mA is connected to COM1, the VCC of COM2 can not use. If the device with 5V/100mA is connected to COM1, Other device with 5V/100mA can be connected to COM2 Port.

2-5 A-(e) H/W Flow Control Timing

When DTR/DSR flow control is select, before transmitting a data, the ECR checks whether the host is BUSY or not. If the host is BUSY, ECR does not transmit a data to the host. If the host is not BUSY, ECR transmits a data to the Host. The host is the same. Refer to the Interface Part of Chapter 7(Special Circuit Diagrams).

2-5 A-(f) S/W Flow Control Timing

When XON/XOFF flow control is selected, the ECR transmits XON(ASCII 11h) or XOFF(ACSII 13h) signal through the Serial Data Line. If the ECR is busy, the printer transmits XOFF(ASCII 13h) to host through the Serial Data Line. Then the host recognizes that the ECR is busy. So, the host does not transmit a data to the ECR. If the ECR is released from busy, the ECR transmits XON(ASCII 11h) to host through the Serial Data Line. Then the host recognizes that the ECR is not busy. And the host transmits a data to the ECR.

2-5 Interface Specifications

2-5 B.IRC Serial Interface

2-5 B-(a) Specification (Same as RS-485 2-Wire Communication Method)

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
Signal Level (Receive)	• Logic"1" : (V_A-V_B) ≥ 0.2V • Logic"0" : (V_A-V_B) ≤ -0.2V	
Baud Rate	• 9600 bps Only	
Data Word Length	• 7 Bit / 8 Bit	
Parity	• None / Even / Odd	
Connector	• Modular Jack Connector 12P (2Port-6Pin)	

Table2-20 IRC Specification

2-5 B-(b) IRC I/F Cable

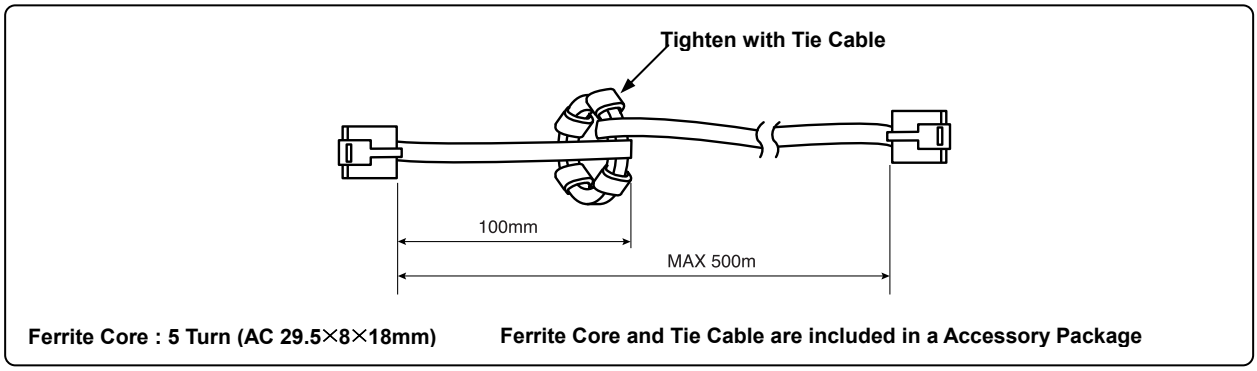

Tighten with Tie Cable
100mm
MAX 500m
Ferrite Core : 5 Turn (AC 29.5×8×18mm)
Ferrite Core and Tie Cable are included in a Accessory Package

Figure2-6 IRC Cable

2-5 B-(c) Cable Connection

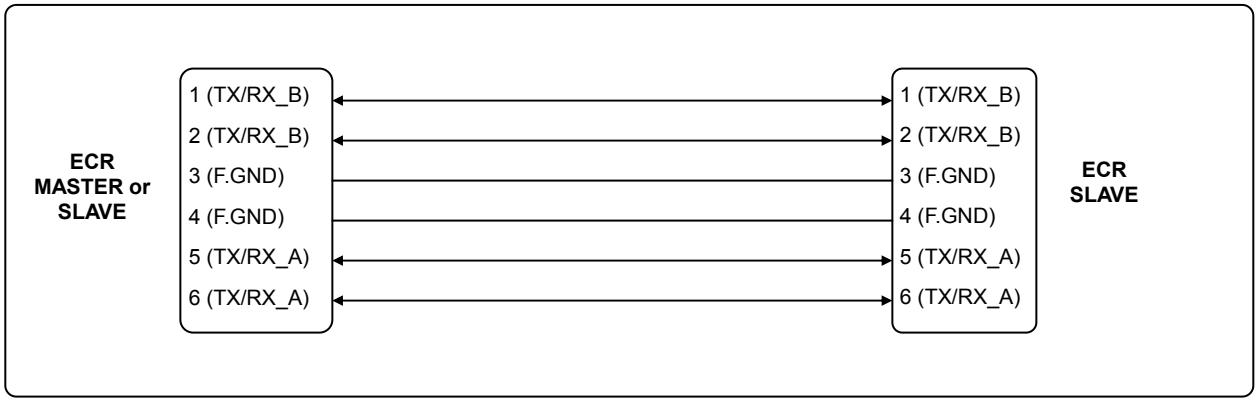


Figure2-7 IRC Cable Connection

2-5 Interface Specifications

2-5 B-(d) Signal Description (Port#1)

Pin No.	Signal Name	Signal Direction	Function
1(7)	TX/RX_B	In/Out	Transmit/Receive Data Line B
2(8)	TX/RX_B	In/Out	Pin 1 and Pin 2 are shorted each other on I/F PBA.
3(9)	F.GND	-	Frame Ground
4(10)	F.GND	-	
5(11)	TX/RX_A	In/Out	Transmit/Receive Data Line A
6(12)	TX/RX_A	In/Out	Pin 4 and Pin 5 are shorted each other on I/F PBA.

Table2-21 IRC Signal Description

Note : The signal description of the Port#2 are same as it of the Port#1

3 Installation and Operation

3-1 System Configuration

3-1 A. Configuration

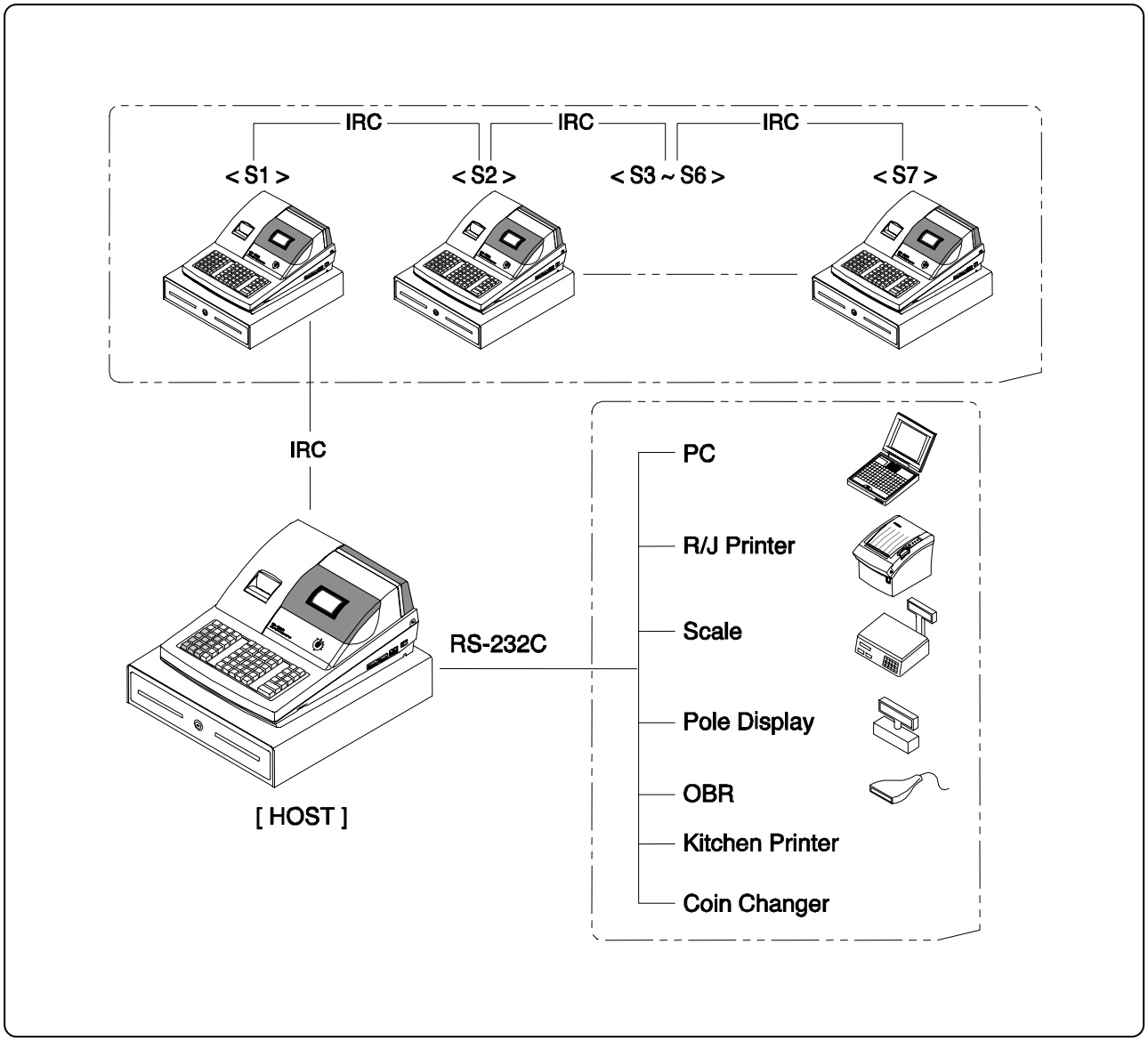


Figure3-1 System Configuration

3-2 Installation

3-2 A. Paper Roll Installation

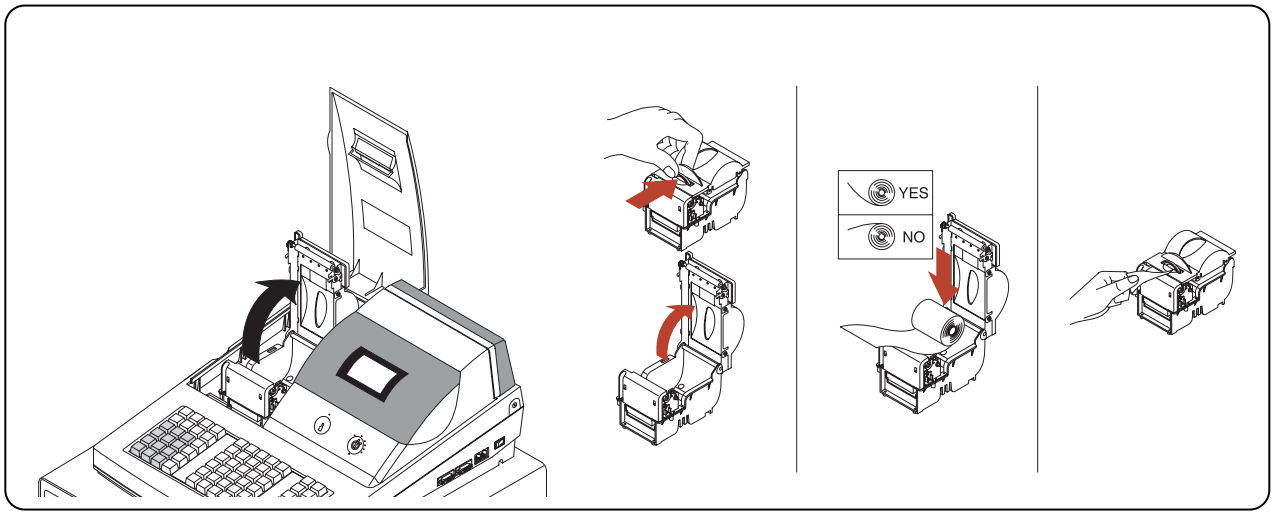


Figure3-2 Paper Installation

1. Open the cover printer.
2. Push the Blue cap Lever towards the rear of the printer and lift up to open the paper cover.
3. Ensure that the paper is being fed from the bottom of the roll,(as illustrated above) place the roll into the concave bottom of the printer. And put the leading edge of the paper over the printer..
4. Close the printer cover slowly until it locks firmly.
   Tear off the excess paper.

3-2 B. RS-232C Serial Cable Installation

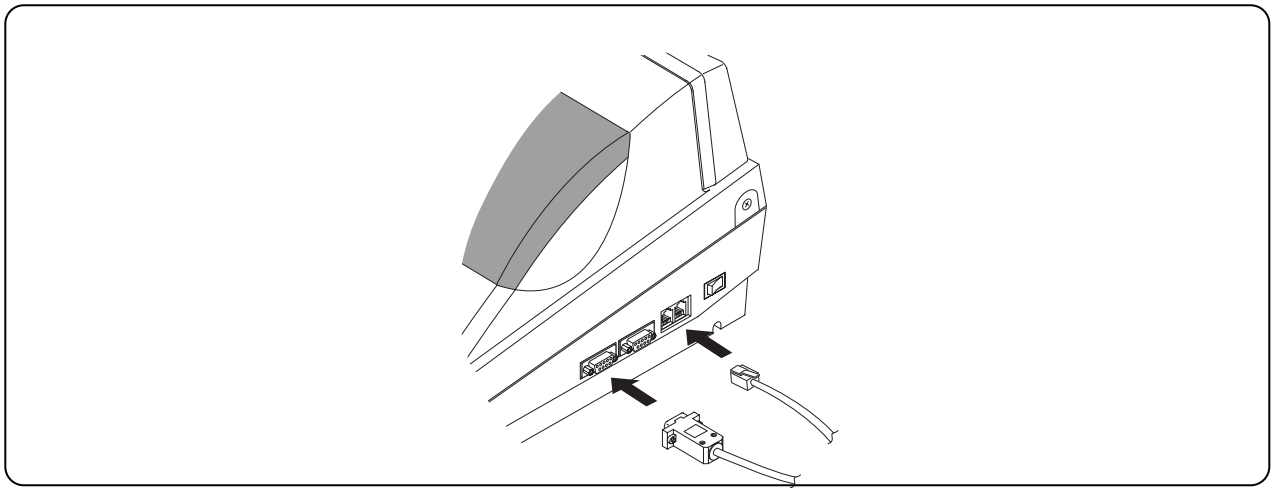


Figure3-3 RS-232C and IRC Cable Installation

1. Connect the RS-232C serial cable to the RS-232C serial port on the right side of ECR.
2. Secure the serial cable with screws.
3. Connect the other end of the RS-232C serial Cable to your host computer.

3-2 C. IRC Serial Cable Installation

1. Connect the IRC serial cable to the IRC port on the right side of ECR.
2. Connect the other end of the IRC serial Cable to other ECR.

3-2 D. Options

No.	Item	Description	Remark
1	RS-232 / IRC I/F Board	I/F PBA	
2	Clerk Key	5EA, 10EA, 15EA	Selectable

Table 3-1 Option

3-2 E. Supplies

No.	Item	Description	Remark
1	Paper Roll	1 EA	
2	Cable Tie	2 EA	
3	Ferrite Core	RING-TR29A : 2 EA	
4	Mode Key	VD, REG, X, Z, P, C	
5	User Manual	1 EA	
6	Clerk Key	5EA, 10EA, 15EA	Option

Table 3-2 Supplies

3-2 Operation

Note: Before using this Electronic Cash Register(ECR) for the first time, leave it powered ON in the REG mode for a at least 24 hours. This allows the Ni-Cad battery, which maintains the ECR's memory while the power is OFF, to fully charge.

3-3 A. Mode Switch

The position of the Mode Switch determines the action of the ECR. The modes are as shown in Table 3-1

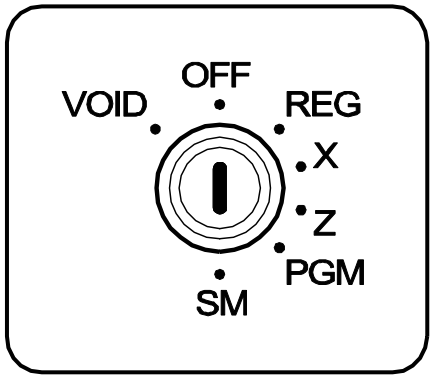


Figure3-4 Mode Switch

Mode	Key	Function
VOID	VD	Use to void (correct) items outside of a sale.
OFF	-	The Register is inoperable.
REG	REG	Use for normal registrations.
X	X	Use to read register reports and perform other manager functions.
Z	Z	Use to read register reports and reset totals to zero.
PGM	P	Use to program the register
SM	C	Use for H/W tests and special setting.

Table3-3 Mode Switch Function

The mode keys can be used to access the following key lock positions.

Key	Accessible Position	Remark
VOID	Void, Off, Register, Manager	
X	Off, Register, Manager	
Z	Off, Register, Manager, Clear Totals	
PGM	Void, Off, Register, Manager, Clear Totals, Program	
C	Void, Off, Register, Manager, Clear Totals, Program, Service Mode	

Table3-4 Key Function

Note: The Key can be removed from the key lock in the OFF or REGISTER position.

3-3 B. Key Board Matrix (Dealer Option)

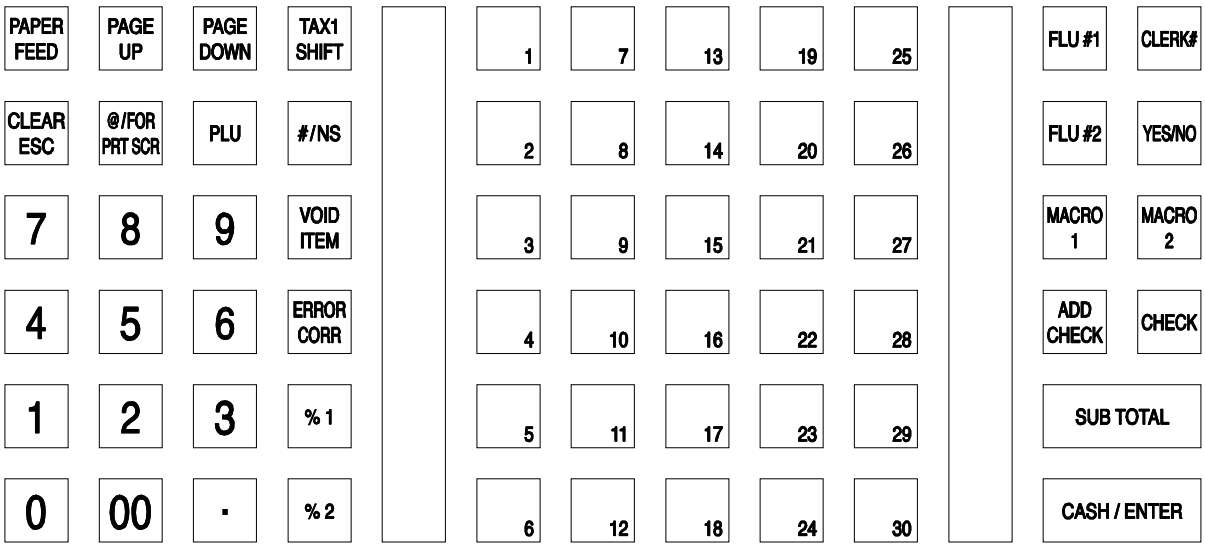


Figure3-5 Key Board

3-3 C. All Clear

This step insures that the cash register is cleared of any totals or programming. After this procedure, the cash register is ready for programming and operation.

WARNING: This is a one time procedure. Do not repeat this procedure after the cash register is programmed, it causes all programs and totals to be erased and to be default.

1. Turn off the power switch.
2. Turn the Mode key marked '**C**' to Service Mode position.
3. Press and hold the **CHECK** key on key board and turn on the power switch at the same time.
4. When "*RAM ALL CLEAR SERV.*" message display, press **PAGE UP**, **0**, **CLERK#** and **CASH/ENTER** in sequence.
5. When memory is cleared, the register prints a message "*RAM ALL CLEAR OK!*"

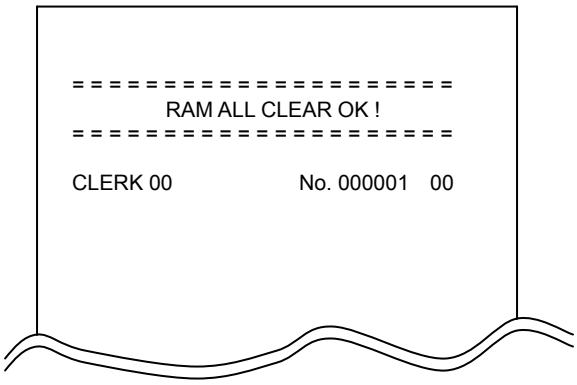


Figure3-6 All Clear

3-3 D. Self Test

1. Turn the Mode key marked '**C**' to Service Mode position.
2. Select "*0. SELF TEST*" from the menu and Press **0** on the key board.
3. H/W test menu will be displayed.
4. Select the number from the menu.

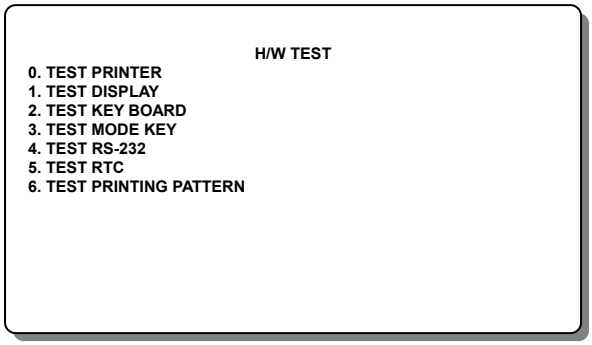


Figure3-7 Self Test

3-3 D-(a) Test Printer

1. Press **0** key on key board.
2. Then the printer prints a test pattern. The printing message shows some information sush as 'TM value','stbIdx (Strobe index)'.
3. After printing, The drawer is opened. Then the printer test is finished.

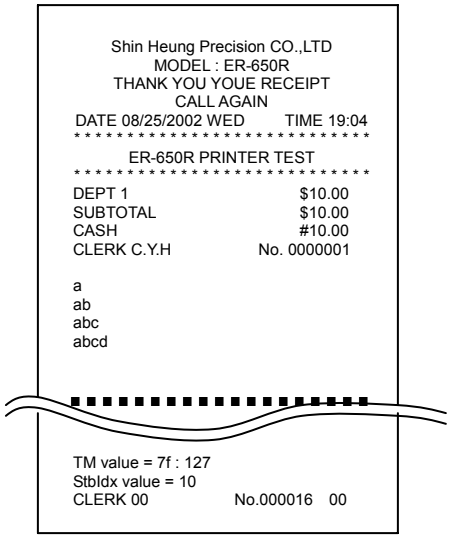


Figure3-8 Printer Self Test

3-3 D-(b) Test Display

1. Press **1** key on key board.
2. Then the buzzer will work for 1 sec.
3. After testing the buzzer, Some characters are displayed on the rear VFD display
4. After testing the rear VFD display, the LCD display tests. The LCD is filled with a black screen. And then the black screen erase.

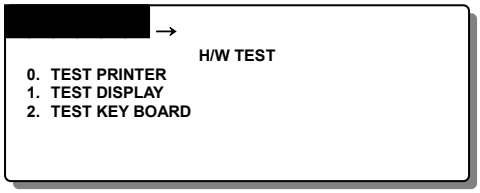


Figure3-9 Display Self Test

3-3 D-(c) Test Key Board

1. Press **2** key on key board.
2. Press any key you want on the key board.
3. Already pressed key will be showed on the LCD screen that the position of key pressed with a black square and key code.
4. Turn the mode key to any position to finish this test.

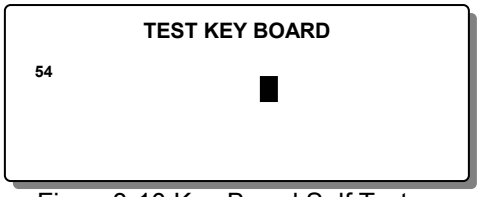


Figure3-10 Key Board Self Test

3-3 D-(d) Test Mode Key

1. Press **3** key on key board.
2. Turn the mode key to any position.
3. The corresponding Mode name will be showed on the LCD screen.

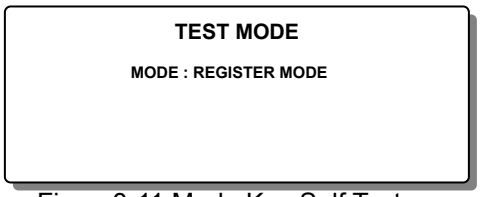


Figure3-11 Mode Key Self Test

3-3 D-(e) Test RS232C

1. Install the serial loop back test jig. (Short “pin 2,3” and “pin 4,6” of DSUB connector)
2. Press **4** key on key board.
3. Press **0** key on the key board. (0= Loop Back Test for RS232 Port#1)
   If error occur, the message (*PORT#1 TEST N.G*) is displayed on LCD and the Buzzer beep. Then Press **“C”** key.
4. Press **1** key on the key board. (1= Loop Back Test for RS232 Port#2)
   If error occur, the message (*PORT#2 TEST N.G*) is displayed on LCD and the Buzzer beep. Then Press **“C”** key.
5. Press **2** key on the key board. (2= Loop Back Test for IRC)
   The message (*TEST IRC OK*) is displayed on LCD.

Note: When the ports is no connection or the cable is open, the Error occur.

Memo

4 Assembly and Disassembly

Caution :

· Before installation, be sure to turn off the power switch.
· Use gloves to protect your hand from being cut by the angle and the chassis.
· Connect all the cables correctly. When connecting or disconnecting the cables, be careful not to apply stress to the cables. (It may cause disconnection)
· Be careful not to bind interface cables and AC power cord together.

4-1 Disassembly the Case Upper Block

4-1 A. Case Upper Block

1. Open the Printer Cover Ass'y (A). (Page 6-1)
2. Remove the two screws (B-15,B-22). (Page 6-3)
3. Lift off the Case Upper Ass'y (B). (Page 6-1)
4. Separate the four harnesses (d,e,f,u) from the Main PBA(E-12). (Page 6-12)
5. Separate the Case Upper Ass'y (B). (Page 6-1)

Note: To Install, Reverse the removal procedure.

4-1 B. LCD and VFD Display Block

1. Remove the two screws (B-24). (Page 6-3)
2. Remove the Window Holder (B-23). (Page 6-3)
3. Separate the LCD Display parts (B-1~6, B-20) from the Case Upper Ass'y (B). (Page 6-3)
4. Separate the VFD Display parts (B-16~19) from the Case Upper Ass'y (B). (Page 6-3)

Note: The position of Ferrite core and the number of turn refer to the display part of chapter specification.
Note: To Install, Reverse the removal procedure.

4-1 C. Mode and Clerk Key Block

1. Remove the three screws(B-12). And separate the Mode and Clerk Key Ass'y (B-8~14) from the Case Upper Assy(B). (Page 6-3)
2. Remove the two screws (B-11). And separate the Mode Key Ass'y (B-14) from the BRKT Mode S/W (B-8). (Page 6-3)
3. Remove the two screws (B-10). And separate the Clerk Key Ass'y (B-13) from the BRKT Mode S/W (B-8). (Page 6-3)

Note: The position of Ferrite core and the number of turn refer to the display part of chapter specification.
Note: To Install, Reverse the removal procedure.

4-2 Disassembly the Case Lower Block

4-2 A. Printer

1. Remove the two screws (E-5,E-13). And separate the GND wire (a, b). (Page 6-12)
2. Remove the screw(C-42) and separate the Cover Front(C-41). (Page 6-5)
3. Separate the harness(C-40). (Page 6-5)
4. Remove the four screws(C-43). (Page 6-5)
5. Separate the Printer Ass'y(C) from the Case Lower Ass'y (E). (Page 6-1)

Note: To Install, Reverse the removal procedure.

4-2 B. RS-232 / IRC I/F PBA

1. Remove the two screws (E-7) on the I/F PBA (E-21). (Page 6-12)
2. Separate the two I/F harnesses (n, q) from the Main PBA (E-12). (Page 6-12)
3. Separate the I/F PBA (E-21) from the Case Lower Ass'y (E). (Page 6-12)

Note: The position of Ferrite core and the number of turn refer to the Serial I/F part of chapter specification.
Note: To Install, Reverse the removal procedure

4-2 C. Power Transformer and Power PBA

1. Separate the two harnesses (j, p) from the Main PBA (E-12) and Power PBA (E-3). (Page 6-12)
2. Remove the two screws (E-1) on the Power Transformer (E-4). (Page 6-12)
3. Remove the Power Transformer (E-4). (Page 6-12)
4. Separate the Power S/W harness (m) and Power Cord harness (k) from Power PBA (E-3). (Page 6-12)
5. Remove the two screws (E-2) on the Power PBA (E-3). (Page 6-12)
6. Remove the Power PBA (E-3). (Page 6-12)

Note: To Install, Reverse the removal procedure.

4-2 D. Main PBA

1. Separate the Drawer, Compulsory harness (r, s) from the Main PBA (E-12). (Page 6-12)
2. Remove the four screws (E-10) on the Main PBA (E-12). (Page 6-12)
3. Remove the Main PBA (E-12). (Page 6-12)

Note: To Install, Reverse the removal procedure.

5 Maintenance and Adjustment

5-1 Maintenance

5-1 A. Cleaning the Printer Head

After printing, the printer head can be very hot. Be careful not to touch it. Also let it cool before you clean it.
Do not damage the printer head by touching it with your fingers or any hard object.

1. Turn the ECR power switch off.
2. Open the printer cover.
3. Open the cover of paper supplier with pushing the blue-cap lever.
4. Clean the Printer Head Thermal Element with a cotton swab moistened with alcohol solvent. (ethanol, methanol IPA)
5. After confirming that alcohol solvent has been dried up completely, close the cover of paper supplier Until be locked.

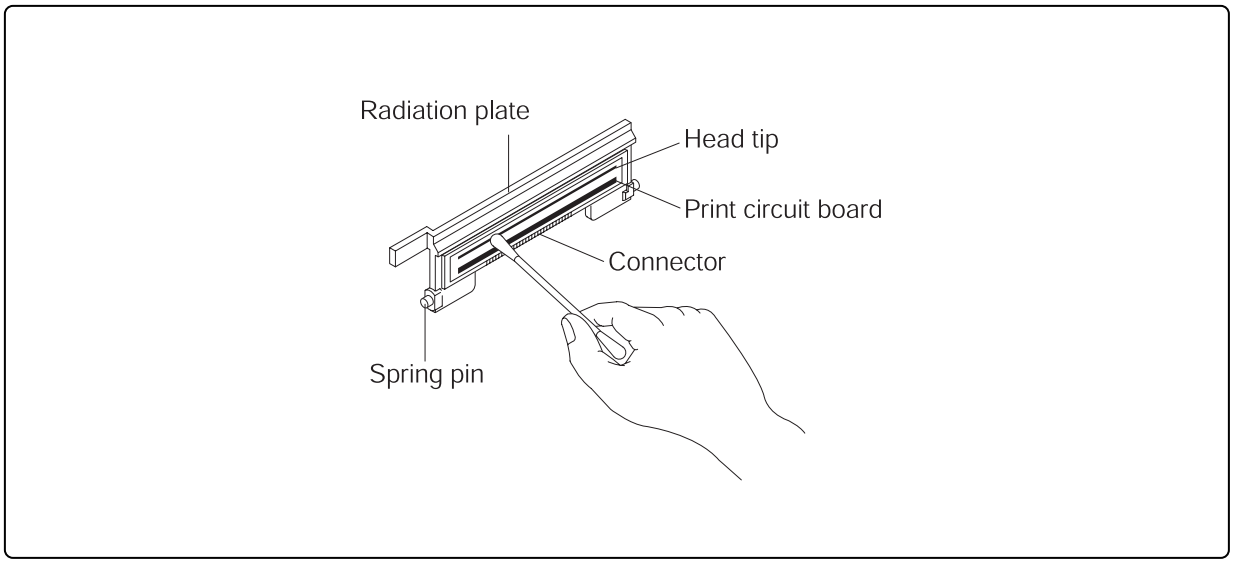


Figure5-1 Clean the Printer Head

Caution: Note that the thermal head becomes very hot during normal operation. To prevent the danger of Burn injury from thermal, be sure to wait for about 10 minutes after turning power off before beginning the cleaning.

5-2 Adjustment

5-2 A. LCD Display Angle

You can adjust the view angle of the Operator LCD Display

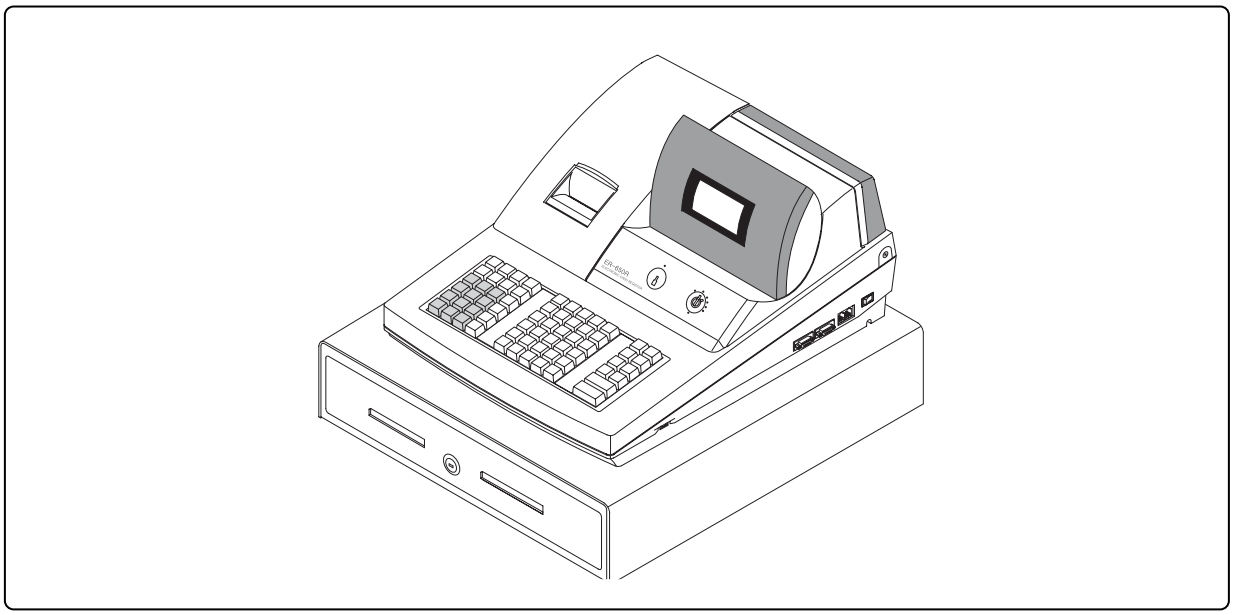


Figure5-2 Adjustment of the View Angle

5-2 B. LCD Display Contrast

You can adjust the contrast of the Operator LCD Display by using the VR on the left side.

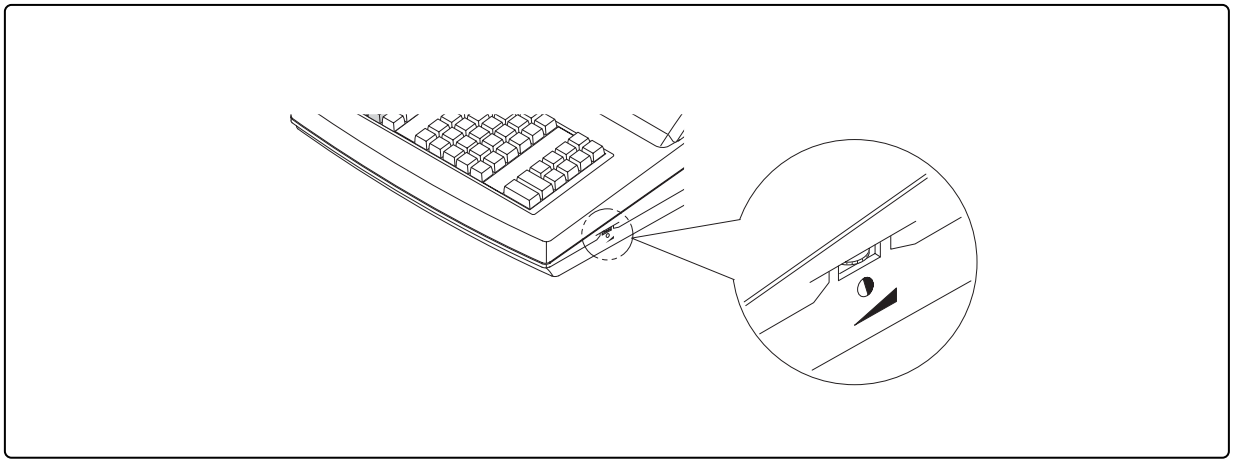


Figure5-3 Adjustment of Contrast

6 Exploded View and Part List

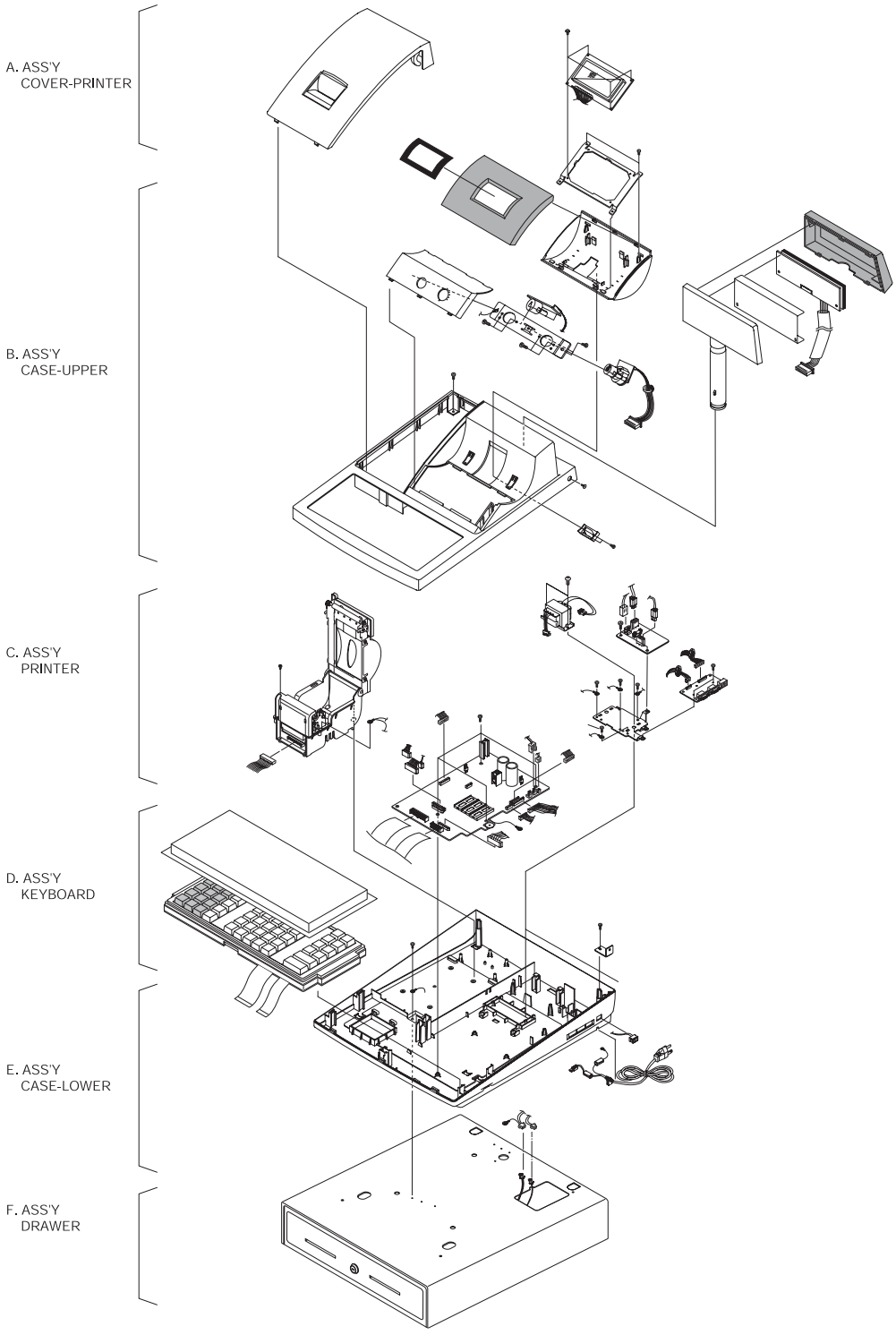


Figure6-1 Total Disassembly (ER-650/ER-650R)

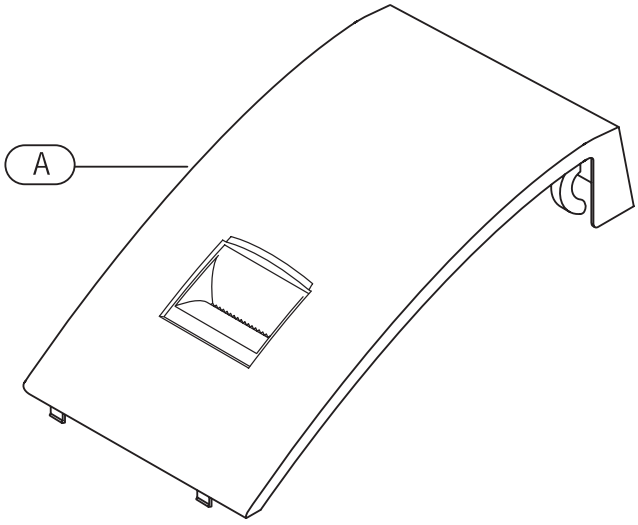


Figure6-2 ASS'Y COVER-PRINTER

A. ASS'Y COVER-PRINTER

No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
A	JK97-10008A	MEA HOU-COVER PRINTER:ER-650R,STD	1		Y	
	JK70-10320A	IPR-CUTTER PAPER	1		N	
	JK72-20011B	PMO-COVER PRINTER	1		N	

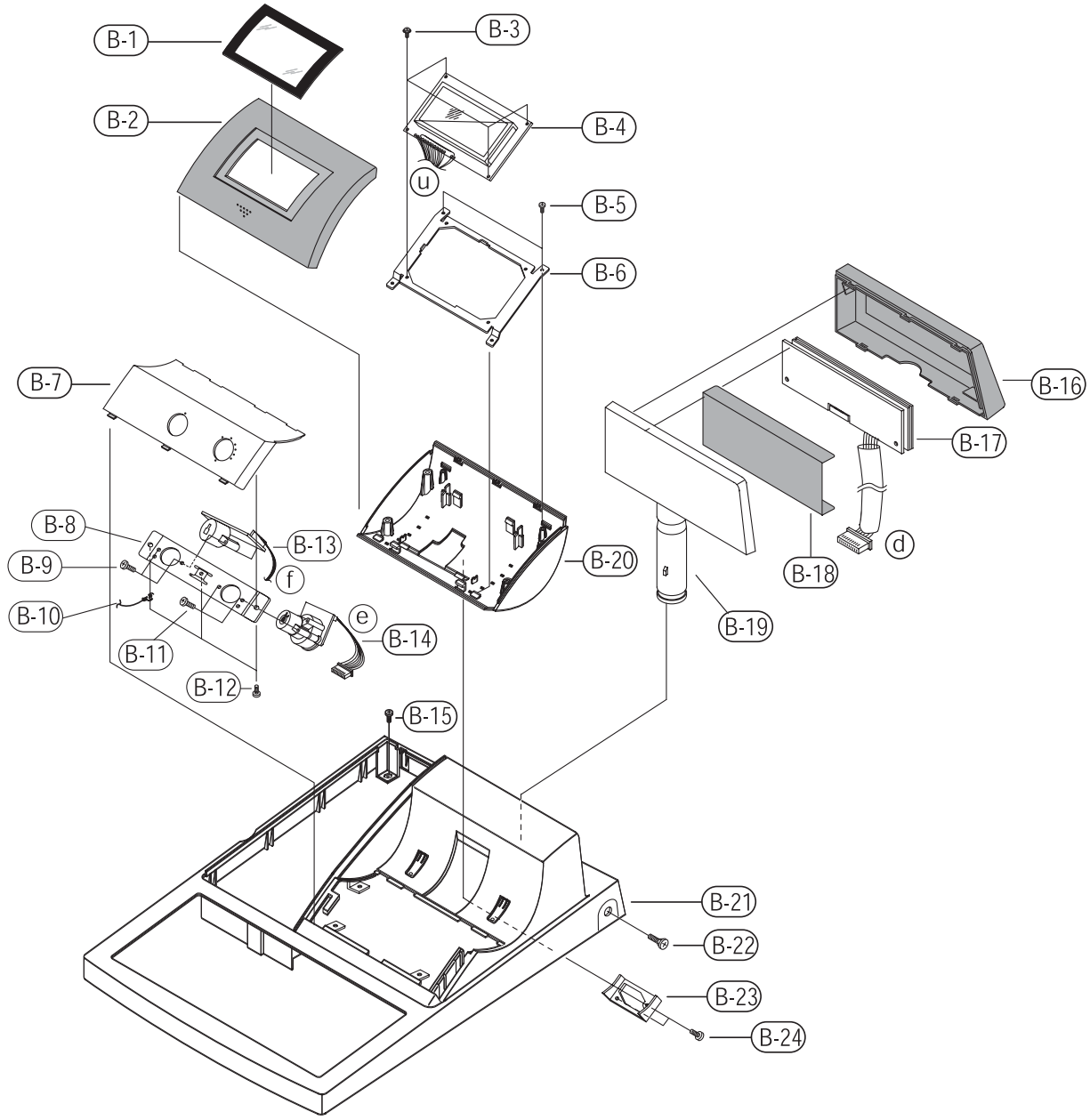


Figure6-3 ASS'Y CASE-UPPER

B. ASS'Y CASE-UPPER

No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
B-1	JK72-00061A	PMO-WINDOW VIEW: PMMA,TRP,T1.2	1		Y	
B-2	JK72-00045A	PMO-WINDOW LCD: PC,BL06,HB	1		Y	
B-3	6006-000003	SCREW-ASS'Y TAPT:WT,BH,+,M2.6,L5.5	4	LCD+BRKT	Y	
B-4	JK96-01080A	ELA ETC-DISPLAY(650):ER-650,BASIC	1		Y	
B-5	6002-000174	SCREW-TAPPING:PWH,+,2,M3,L10,ZPC	2	W/L+BRKT	Y	
B-6	JK70-10408A	IPR-BRKT WINDOW_LCD: SECC,T1.2	1		Y	
B-7	JK72-20012A	PMO-COVER MODE S/W: HIPS(V0)	1		Y	
	JK72-20013A	PMO-COVER CLERK KEY: HIPS(V0)	1		Y	
B-8	JK70-00052A	IPR-BRKT MODE S/W: SECC,T1.0	1		Y	
B-9	6002-000319	SCREW-TAPPING:PH,+,2,M3,L8,ZPC(YEL)	2	B/MODE+CLERK	Y	
B-10	JK39-40508A	CBF HARNESS:UL1015,350mm	1		Y	
B-11	6002-000319	SCREW-TAPPING:PH,+,2,M3,L8,ZPC(YEL)	2	B/MODE+ROTARY	Y	
B-12	6002-000319	SCREW-TAPPING:PH,+,2,M3,L8,ZPC(YEL)	3	B/MODE+C/MODE	Y	
B-13	JK96-01081A	ELA ETC-CLERK:BASIC	1		Y	
B-14	JK96-00956A	ELA ETC-MODEKEY ASSY: NO CORE	1		Y	
B-15	6002-000172	SCREW-TAPPING:PH,+,2S,M4,L15,STS304	1	C/U+C/L(LEFT)	Y	
B-16	JK72-00034A	PMO-WINDOW TURRET:PC,BL06,HB	1		Y	
B-17	JK92-00970A	PBA SUB-650,TURRET:BASIC	1		Y	
B-18	JK68-00013A	LABEL(P)-TURRET SHEET: PE,L100*W70	1		Y	
B-19	JK72-00016A	PMO-TURRET BODY: HIPS(V0)	1		Y	
B-20	JK72-00047A	PMO-WINDOW LOWER: HIPS(V0)	1		Y	
B-21	JK72-00038A	PMO-CASE UPPER: HIPS(V0)	1		Y	
B-22	6001-000367	SCREW-MACHINE:FH,+,M4,L10,NI	1	C/U+C/L(RIGHT)	Y	
B-23	JK72-00048A	PMO-WINDOW HOLDER: POM,WHITE,HB	1		Y	
B-24	6002-000174	SCREW-TAPPING:PWH,+,2,M3,L10,ZPC	2		Y	

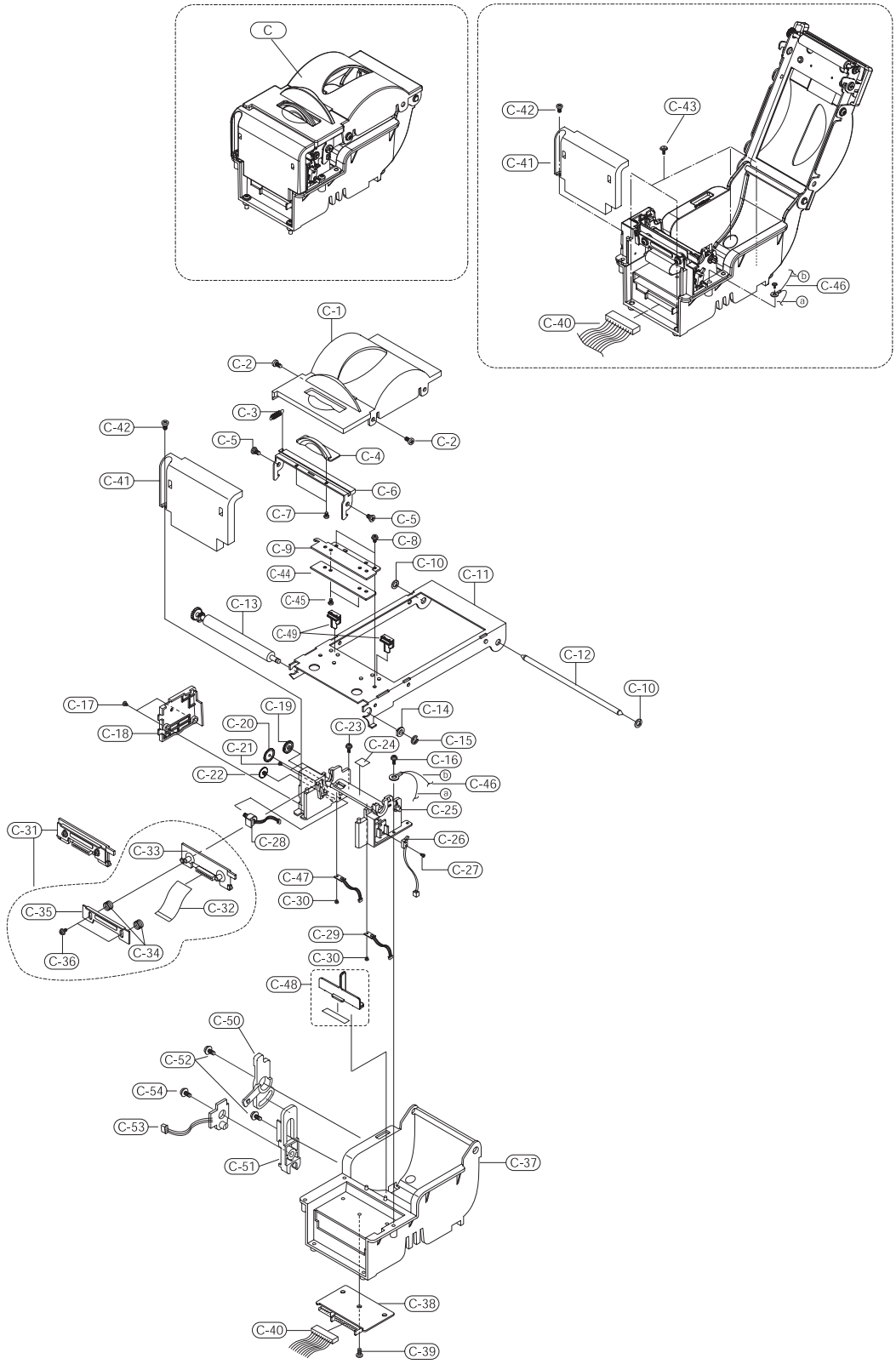


Figure6-4 ASS'Y PRINTER(STM-210)

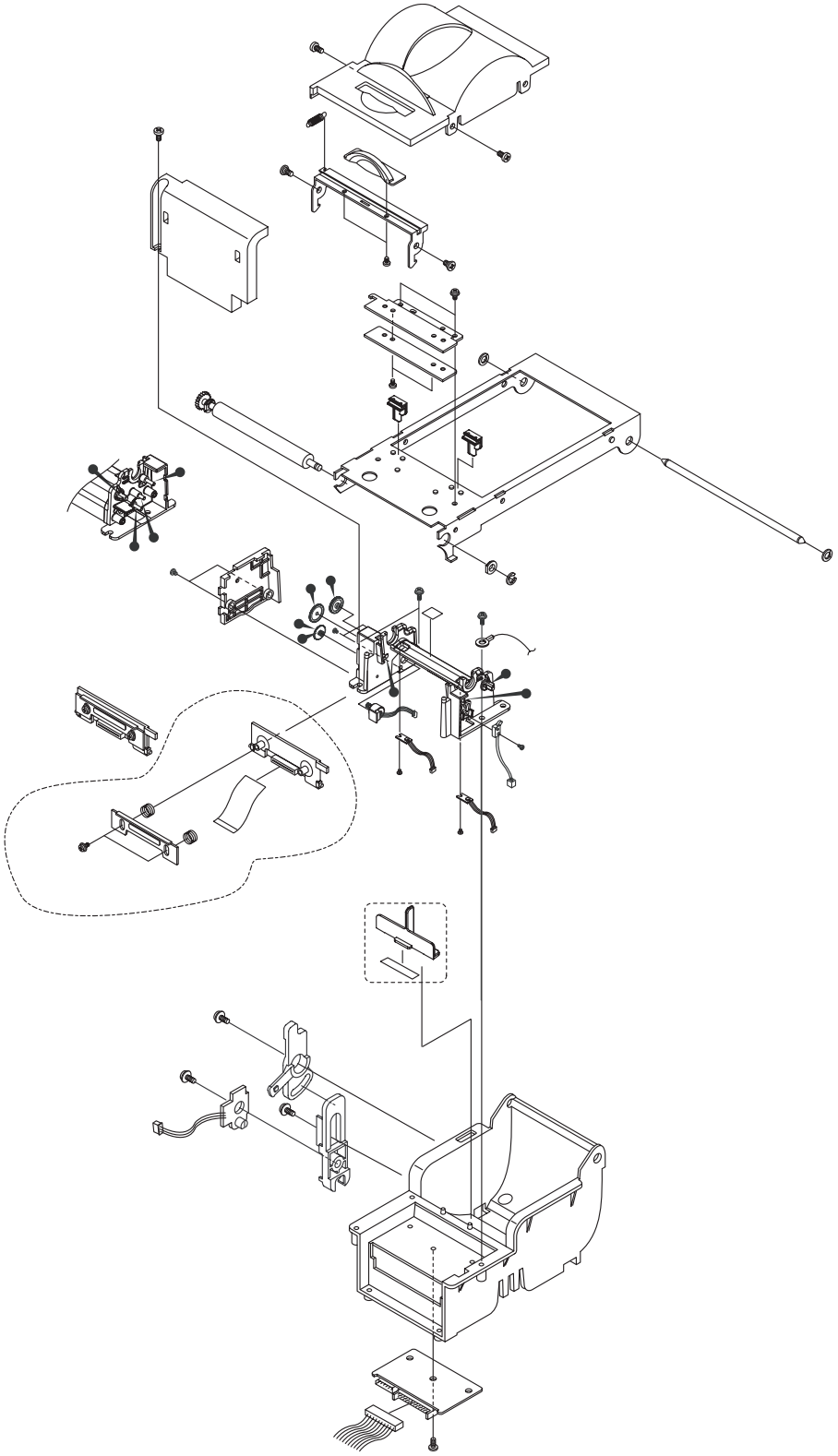


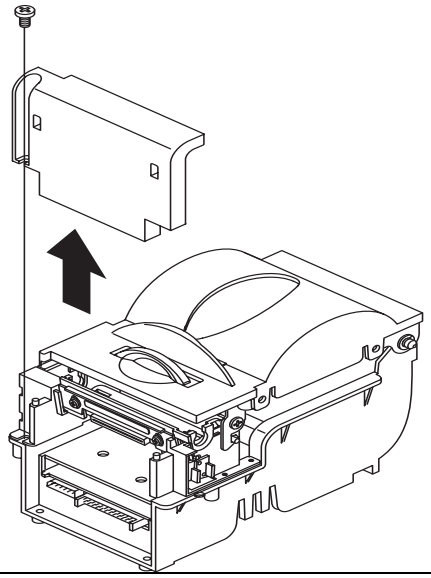
Figure6-5 Lubrication Points of the Printer (STM-210)

C. ASS'Y PRINTER

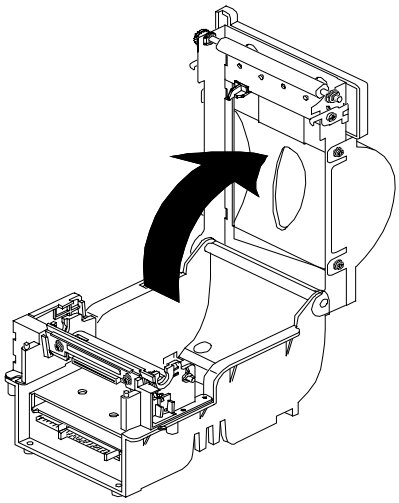
No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
C	JK59-20001A	UNIT-PRINTER:STM-210(A)	1		Y	ER-650
	JK59-20001B	UNIT-PRINTER:STM-210(B)	1		Y	
	JK59-20001C	UNIT-PRINTER:STM-210(C)	1		Y	
	JK59-20001D	UNIT-PRINTER:STM-210(D)	1		Y	
	JK59-20005A	UNIT-PRINTER:STM-220	1		Y	
C-1	JK72-20001A	PMO-COVER TOP: HIPS(HB),IVORY	1		Y	
C-2	6001-000665	SCREW-MACHINE: PWH,+,2,M3,L4,ZPC	2		Y	
C-3	JK70-30001A	SPRING-HOOK: SWP	1		Y	
C-4	JK72-20003A	PMO-CAP LEVER: HIPS(HB),BLUE	1		Y	
C-5	JK60-00003A	SCREW-SPECIAL: SUM 24L,WHITE	2		Y	
C-6	JK70-20003A	IPR-BRACKET HOOK: SECC T1.0	1		Y	
C-7	JK70-50011A	SCREW TAPPING: PH,+,2,M2,L4,WHITE	2		Y	
C-8	6001-000665	SCREW-MACHINE: PWH,+,2,M3,L4,ZPC	2		Y	
C-9	JK70-20002A	IPR-FIXED CUTTER: SECC T1.2	1		Y	
C-10	JK70-50004A	POLY WASHER: Φ3.1,RED	2		Y	
C-11	JK70-20001A	IPR-COVER HOUSING: SECC T1.0	1		Y	
C-12	JK70-70001A	ICT-SHAFT HINGE: SUM	1		Y	
C-13	JK97-10002A	ASSY-PLATEN ROLLER: STM-210	1		Y	
C-14	JK70-50002A	ICT-BUSHING	1		Y	
C-15	JK70-50010A	E-RING: Φ2.0, T0.5	1		Y	
C-16	6002-000147	SCREW-TAPPING: PH,+,2,M3,L10,ZPC	1		Y	
C-17	JK70-50009A	SCREW-MACHINE: RH,+,2,M2,L4,WHITE	2		Y	
C-18	JK72-20005A	PMO-SIDE COVER: POM,BLK	1		Y	
C-19	JK72-20007A	PMO-GEAR REDUCTION 17_39: POM	1		Y	
C-20	JK72-20008A	PMO-GEAR REDUCTION 21_41: POM	1		Y	
C-21	JK70-50006A	SCREW-MACHINE: RH,+,2,M1.7,L2,WHITE	2		Y	
C-22	JK72-20006A	PMO-GEAR REDUCTION 13_43: POM	1		Y	
C-23	6002-000147	SCREW TAPPING: PH,+,2,M3,L10,ZPC	1		Y	
C-24	JK68-40002A	LABEL(P)-WARNING HOT: ART-PAPER	1		Y	
C-25	JK70-20004A	IPR-MAIN FRAME	1		Y	
C-26	JK96-01233A	ELA-LEVER SENSOR	1		Y	
C-27	JK70-50007A	SCREW-MACHINE: RH,+,2,M1.7,L8,WHITE	1		Y	
C-28	JK59-40001A	MOTOR ASS'Y: STM-210	1		Y	
C-29	JK96-01231A	ELA-P/END SENSOR: STM-210	1		Y	
C-30	JK70-50009A	SCREW-MACHINE: RH,+,2,M2,L4,WHITE	1		Y	STM-210
	JK70-50009A	SCREW-MACHINE: RH,+,2,M2,L4,WHITE	2		Y	STM-220
C-31	JK97-10004A	ASS'Y TPH: STM-210	1		Y	
C-32	JK39-40554A	CBF SIGNAL-PRINTER FFC: 21P,120MM	1		Y	
C-33	JK97-10004B	ASS'Y TPH,HEAT-SINK: STM-210	1		Y	
	JK47-10001A	TPH: ROHM	1		N	
	JK70-50005A	TPH TAPE: 3M	1		N	
	JK70-20006A	HEAT-SINK: ZNDC	1		N	
C-34	JK70-30002A	SPRING-TPH: SWP	2		Y	
C-35	JK70-20005A	IPR-BRACKET-REAR: SECC T1.0	1		Y	
C-36	6001-000665	SCREW-MACHINE: PWH,+,2,M3,L4,ZPC	2		Y	
C-37	JK72-20002A	PMO-PAPER SUPPLY: ABS+GF 20%	1		Y	
C-38	JK92-01224A	PBA-SUB PRT CONN BOARD: STM-210	1		Y	

C-39	6002-000175	SCREW-TAPPING: PWH,+,2,M3,L8,ZPC	1		Y	
C-40	JK39-00012A	CBF-HARNESS-KEY OPTION: 200mm	1		Y	
C-41	JK72-20009A	PMO-COVER FRONT: HIPS(HB): NONE A/C	1		Y	
C-42	6002-000147	SCREW TAPPING: PH,+,2,M3,L10,ZPC	1		Y	
C-43	6003-000198	SCREW TAPPING: PWH,+,2,M3,L12,ZPC	4		Y	
C-44	JK70-20010A	IPR-FIXED BLADE: SKH-51,T1.4	1		Y	ONLY SAC-60
C-45	6001-000665	SCREW-MACHINE: PWH,+,2,M3,L4,ZPC	2		Y	
C-46	JK39-40021A	CBF HARNESS: UL1015,330/130,GRN	1		Y	
C-47	JK96-01231B	ELA-P/END SENSOR: STM-220	1		Y	
C-48	JK96-10141A	ELA PARTITION ASS'Y: STM-220	1		Y	STM-220
C-49	JK72-20114A	PMO-PAPER SEPARATOR: ABS,BLACK	1		Y	
	JK72-20114A	PMO-PAPER SEPARATOR: ABS,BLACK	2		Y	STM-220
C-50	JK72-20023A	PMO-HOSUING-PAPER END	1		Y	OPTION
C-51	JK72-20023A	PMO-KNOB-PAPER END	1		Y	
C-52	6002-000175	SCREW-TAPPING: PWH,+,2,M3,L8,ZPC	2		Y	
C-53	JK96-01232A	ELA NEAR PAPER END SENSOR PCB	1		Y	
C-54	6002-001079	SCREW-TAPPING: PWH,+,2,M3,L5,ZPC	1		Y	

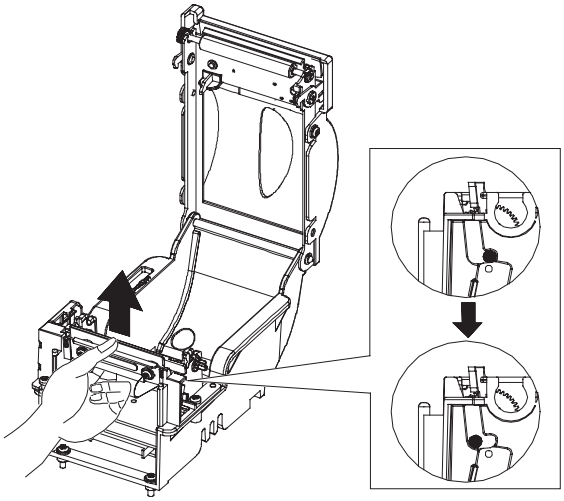
1.Unscrew the bolt of COVER FRONT and disassemble it from the PRINTER.



2. Open the COVER TOP.



3. Disassemble the TPH assembly by pulling the lower part of TPH assembly and lift it up.



4. Assemble the TPH assembly in reverse order and close the COVER TOP.

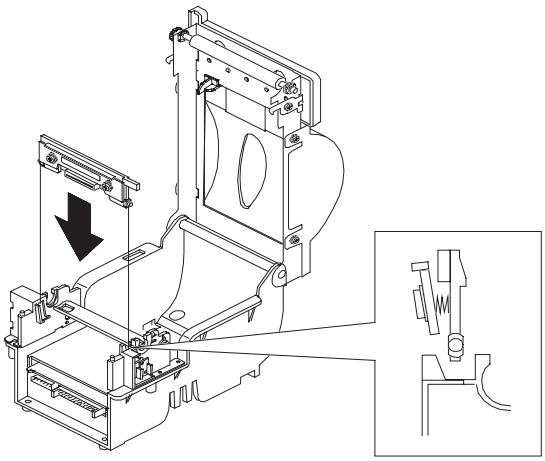


Figure6-6 Thermal Printer Head assembly replacement

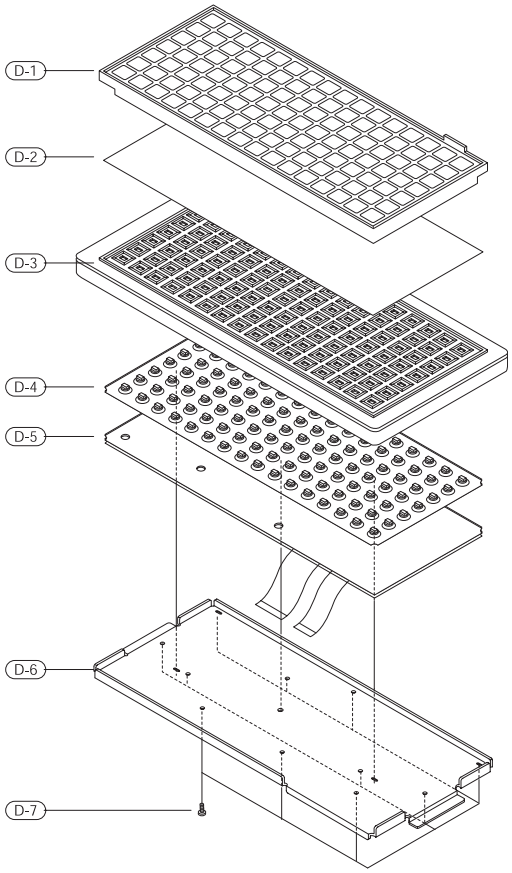


Figure6-7 ASS'Y KEYBOARD (FLAT)

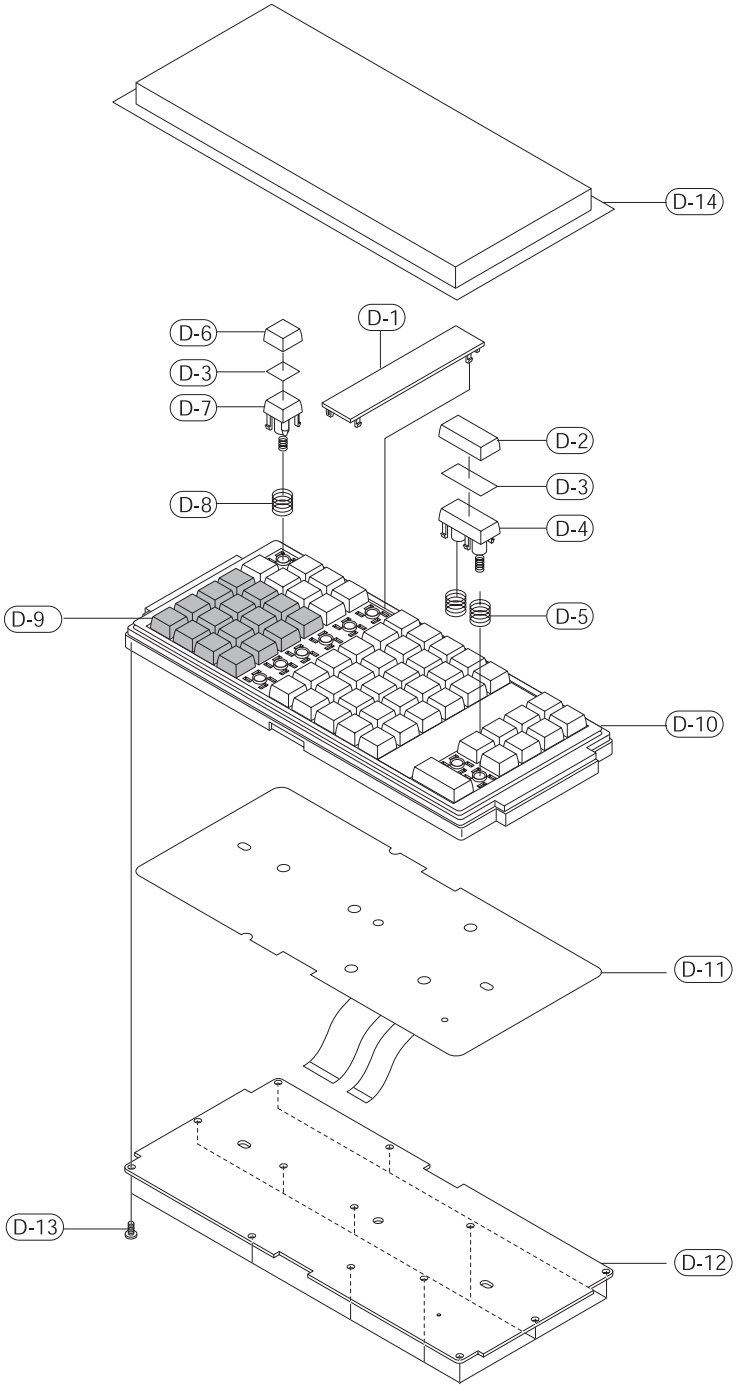


Figure6-8 ASS'Y KEYBOARD (RAISED)

D. ASS'Y KEYBOARD

- FLAT(98 KEY)

No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
D	JK59-00006A	UNIT-KEYBOARD: 98KEY	1		Y	
D-1	JK73-00006A	RMO-WATER PROOF: SILICON,100*200	1		Y	
D-2	JK68-00054A	LABEL-MARK KBD SHEET: PC	1		N	
D-3	JK72-00051A	PMO-KEYBOARD HOUSING: HIPS(V0)	1		Y	
D-4	JK73-00007A	RMO-KEY RUBBER: SILICON,260*117	1		Y	
D-5	JK96-01115A	ELA ETC-FPC ASSY: STD	1		Y	
D-6	JK70-00053A	IPR-KBD FRAME: SECC,T1.0	1		Y	
D-7	JK81-20005A	SCREW-TAPTITE	11		Y	

- RAISED(78 KEY)

No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
D	JK59-30001A	UNIT-KEYBOARD: USA,STD	1		Y	
	JK59-30002A	UNIT-KEYBOARD: EUROPE,STD	1		Y	
	JK59-30002B	UNIT-KEYBOARD: GERMAN			Y	
	JK59-30002C	UNIT-KEYBOARD: FRENCH			Y	
	JK59-30002D	UNIT-KEYBOARD: SPANISH			Y	
D-1	JK72-20010A	PMO-BLANK KEY-TOP(1*6): POM,IVORY	1		Y	
D-2	JK81-10946A	AS-KEY/CAP,L: 1X2	2		Y	
D-3	-	LABEL-KEY TOP SET: ER-650R	1		N	
D-4	JK81-10286B	AS-SPRING CONTACT: 601KAS-001	62		Y	
D-5	JK81-20001A	SPRING-RETURN: 1X2	4		Y	
D-6	JK81-10945A	KEY-CAP(S): 1X1	50		Y	
D-7	JK81-20013A	KEY-TOP ASS'Y(S),1X1	50			
D-8	JK81-10285T	AS-SPRING RETURN: 1X1	50		Y	
D-9	JK81-10933A	KEY-TOP,1	1		Y	
	JK81-10934A	KEY-TOP,2	1		Y	
	JK81-10935A	KEY-TOP,3	1		Y	
	JK81-10936A	KEY-TOP,4	1		Y	
	JK81-10937A	KEY-TOP,5	1		Y	
	JK81-10938A	KEY-TOP,6	1		Y	
	JK81-10939A	KEY-TOP,7	1		Y	
	JK81-10940A	KEY-TOP,8	1		Y	
	JK81-10941A	KEY-TOP,9	1		Y	
	JK81-10942A	KEY-TOP,0	1		Y	
	JK81-10943A	KEY-TOP,00	1		Y	
	JK81-10944A	KEY-TOP,●	1		Y	
D-10	JK81-20002A	KBD-HOUSING	1		Y	
D-11	JK81-20003A	AS-FPC ASSY:ER-650R	1		Y	
D-12	JK81-20004A	FRAME	1		Y	
D-13	JK81-20005A	SCREW-TAPTITE	13		Y	
D-14	JK73-20211A	WATER- PROOF:ER-650R,URETANE	1		Y	

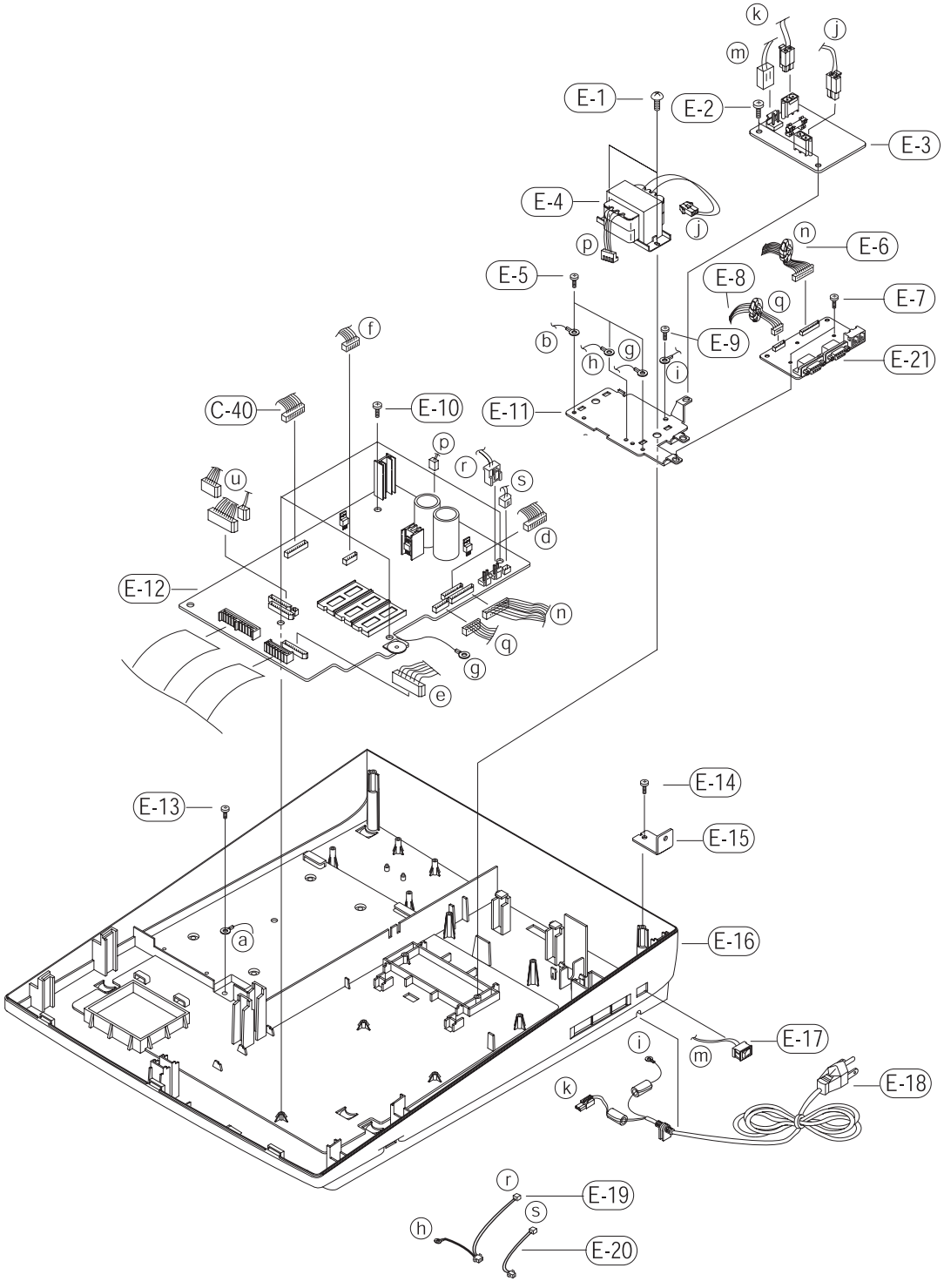


Figure9-6 ASS'Y CASE-LOWER

E. ASS'Y CASE-LOWER

No.	Parts No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
E-1	6006-000195	SCREW-ASS'Y TAPP:WS,BH,+,M4,L10,ZPC	2		Y	
E-2	6002-000174	SCREW-TAPPING:PWH,+,2,M3,L10,ZPC	2		Y	
E-3	JK92-00949A	PBA PWR-650: BASIC	1		Y	
E-4	JK26-00013A	TRANS POWER-USA: 120V	1		Y	
	JK26-00014A	TRANS POWER-EUROPE: 230V	1		Y	
E-5	JK60-00001A	SCREW-ASSY TAPTITE: BH,WT,M3,L8,ZPC	3		Y	
E-6	JK39-00037A	CBF HARNESS-I/F: FLAT,UL1007	1		Y	
E-7	6002-000174	SCREW-TAPPING:PWH,+,2,M3,L10,ZPC	2		Y	
E-8	JK39-00039A	CBF HARNESS-RS232: FLAT,UL1007	1		Y	
E-9	6006-000199	SCREW-ASS'Y TAPT:WT,BH,+,M4,L8,ZPC	1		Y	
E-10	6002-000174	SCREW-TAPPING:PWH,+,2,M3,L10,ZPC	4		Y	
E-11	JK70-00049A	IPR-GROUND PLATE: SECC,T0.8	1		Y	
E-12	JK92-01223A	PBA MAIN-BOARD:ER-650R,BASIC	1		Y	
E-13	6003-001149	SCREW-TAPTITE:PWH,+,S,M4,L10,ZPC	1		Y	
E-14	6002-000171	SCREW-TAPPING:PH,+,2S,M4,L10,ZPC	1		Y	
E-15	JK70-00046A	IPR-BRKT CASING: SECC,T2.0	1		Y	
E-16	JK72-00039A	PMO-CASE LOWER: HIPS(V0)	1		Y	
E-17	JK39-00008A	CBF- POWER S/W: UL1617,UL/CSA,150	1		Y	
E-18	JK39-10002A	CBF-POWER CORD: AUSTRALIA	1		Y	
	JK39-10003A	CBF-POWER CORD: USA	1		Y	
	JK39-10008A	CBF-POWER CORD: UK	1		Y	
	JK39-10501A	CBF-POWER CORD: EUROPE	1		Y	
E-19	JK39-40200A	CBF HARNESS: UL1007,250MM	1		Y	
E-20	JK39-40302C	CBF HARNESS: UL1007,180MM	1		Y	
E-21	JK92-00948D	PBA I/F-BOARD	1		Y	

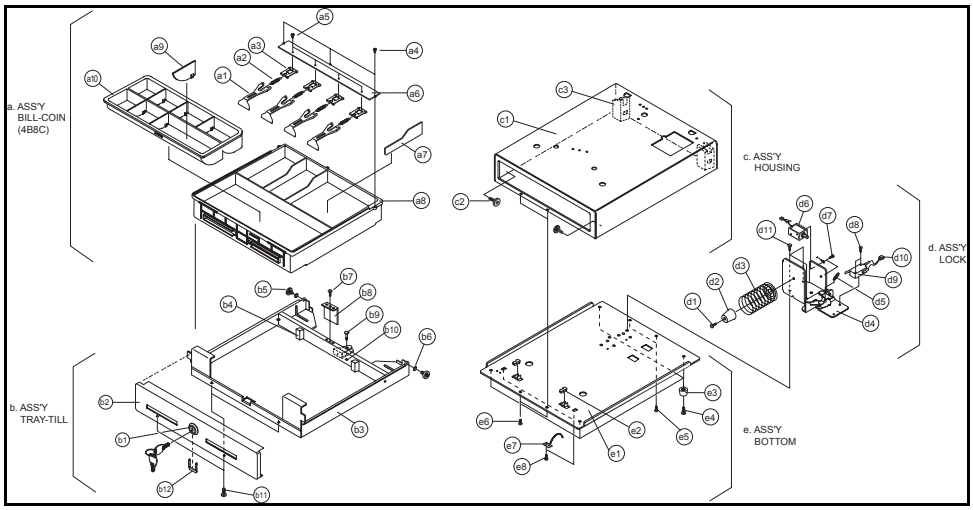


Figure6-10 ASS'Y DRAWER (4B/8C)

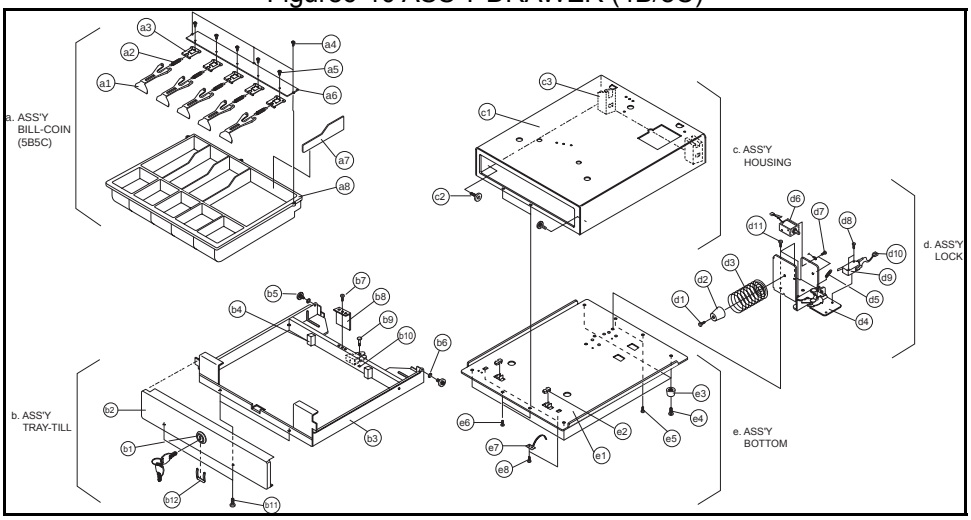


Figure6-11 ASS'Y DRAWER (5B/5C)

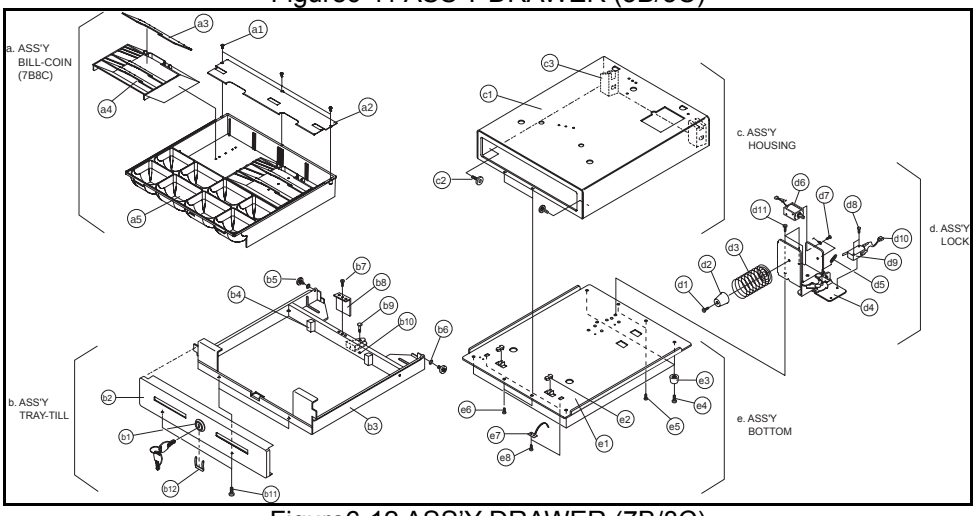


Figure6-12 ASS'Y DRAWER (7B/8C)

F. ASS'Y DRAWER

(a) ASS'Y BILL-COIN (4B/8C, 5B/5C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a	JK97-20014A	MEA-UNIT BILL COIN: A-TYPE, 4B8C	1		Y	
	JK97-00407A	MEA-UNIT BILL COIN: A-TYPE, 5B5C	1		Y	
a-1	JK72-40267A	PMO-LEVER PRESS: A-TYPE,POM	4		Y	
a-2	6107-000134	SPRING ES: SUS304	4		Y	
a-3	JK70-10314A	IPR-HOLDER LEVER: A-TYPE,T1.2,ZPC	4		Y	
a-4	6002-000175	SCREW-TAPPING: PWH,+2,M3,L8,ZPC(YEL)	3		Y	
a-5	6002-001078	SCREW-TAPPING: PWH,+2,M3,L5	4		Y	
a-6	JK70-10304A	IPR-PLATE HOLDER: A-TYPE,SBHG-1,T1.2	1		Y	
a-7	JK72-40269A	PMO-PANEL PARTITION: A-TYPE,HIPS,BLK	3		Y	
a-8	JK72-20088A	PMO-BILL COIN TILL: A-TYPE,4B8C,HIPS,BLK	1		Y	
	JK72-40268A	PMO-BILL COIN TILL: A-TYPE,5B5C,HIPS,BLK	1		Y	
a-9	JK72-20090A	PMO-COIN PARTITION: A-TYPE,4B8C	6		Y	
a-10	JK72-20089A	PMO-COIN TILL: A-TYPE,4B8C,-	1		Y	

(a) ASS'Y BILL-COIN (7B/8C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a	JK97-01103A	MEA-UNIT BILL COIN: A-TYPE, 7B8C	1		Y	
a-1	6002-000175	SCREW-TAPPING: PWH,+2,M3,L8,ZPC(YEL)	3		Y	
a-2	JK70-00068A	IPR-HOLDER PLATE: A-TYPE,SBHG-1, T1.2	1		Y	
a-3	JK72-00083A	PMO-BILL PARTITION: A-TYPE,HIPS,BLK	5		Y	
a-4	JK72-00082A	PMO-BILL TILL: A-TYPE,HIPS,BLK	2		Y	
a-5	JK72-00084A	PMO-BILL COIN TILL: A-TYPE,HIPS,BLK	1		Y	

(b) ASS'Y TRAY-TILL

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
b	JK97-01073B	MEA-UNIT TRAY TILL: A-TYPE,5B5C	1		N	
	JK97-01073D	MEA-UNIT TRAY TILL: A-TYPE,4B8C,7B8C(EURO)	1		N	
b-1	JK75-10389A	MEC-LOCK: DRAWER	1		Y	
b-2	JK70-10014A	IPR-PLATE FRONT: A-TYPE,SBC-1,T1.0	1		Y	
	JK70-10014B	IPR-PLATE FRONT: A-TYPE,4B8C,7B8C	1		Y	
b-3	JK75-00025A	MEA-TRAY TILL: A-TYPE,4B8C,7B8C	1		N	
	JK75-00025B	MEA-TRAY TILL: A-TYPE,5B5C	1		N	
b-4	JK73-10203A	RPR-TENSION: DRAWER,SPONGE,BLK	2		N	
b-5	JK75-10386A	MEC-ROLLER: DRAWER,DR-10-B1/ Φ19	2		Y	
b-6	6031-000549	WASHER-PLAIN: IDΦ6.5,ODΦ13, T1.0	2		Y	
b-7	6003-000221	SCREW-TAPTITE: PWH,+2,M4,L8,ZPC(YEL)	1		Y	
b-8	JK70-10324A	IPR-SUPPORT TRAY: DRAWER,SBHG-1,T1.2	1		N	
b-9	JK70-40302A	ICT,SHAFT PIN: A-TYPE	1		N	
b-10	6044-000124	RING-E: IDΦ3,ODΦ7, T0.6,ZPC(BLK),STSC	1		Y	
b-11	6002-001042	SCREW-TAPPING: FH,+2,M3,L6	2		Y	
b-12	JK70-10323A	IPR-PLATE CLIP: DRAWER,SWP,T0.5	1		Y	

(c) ASS'Y HOUSING

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
c	JK97-01074A	MEA-COVER HOUSING: A-TYPE,BASIC	1		N	
	JK97-01074B	MEA-COVER HOUSING: A-TYPE,NONE HOLE,OPTION	1		N	
c-1	JK75-00026A	MEA-SUB HOUSING: A-TYPE,BASIC	1		N	
	JK75-00026B	MEA-SUB HOUSING: A-TYPE,NONE HOLE,OPTION	1		N	
c-2	JK75-10386A	MEC-ROLLER: DRAWER,DR-10-B1/ Φ19	2		N	
c-3	JK73-20207A	REX-PAD DRAWER: DRAWER,NR,BLK	2		N	

(d) ASS'Y LOCK

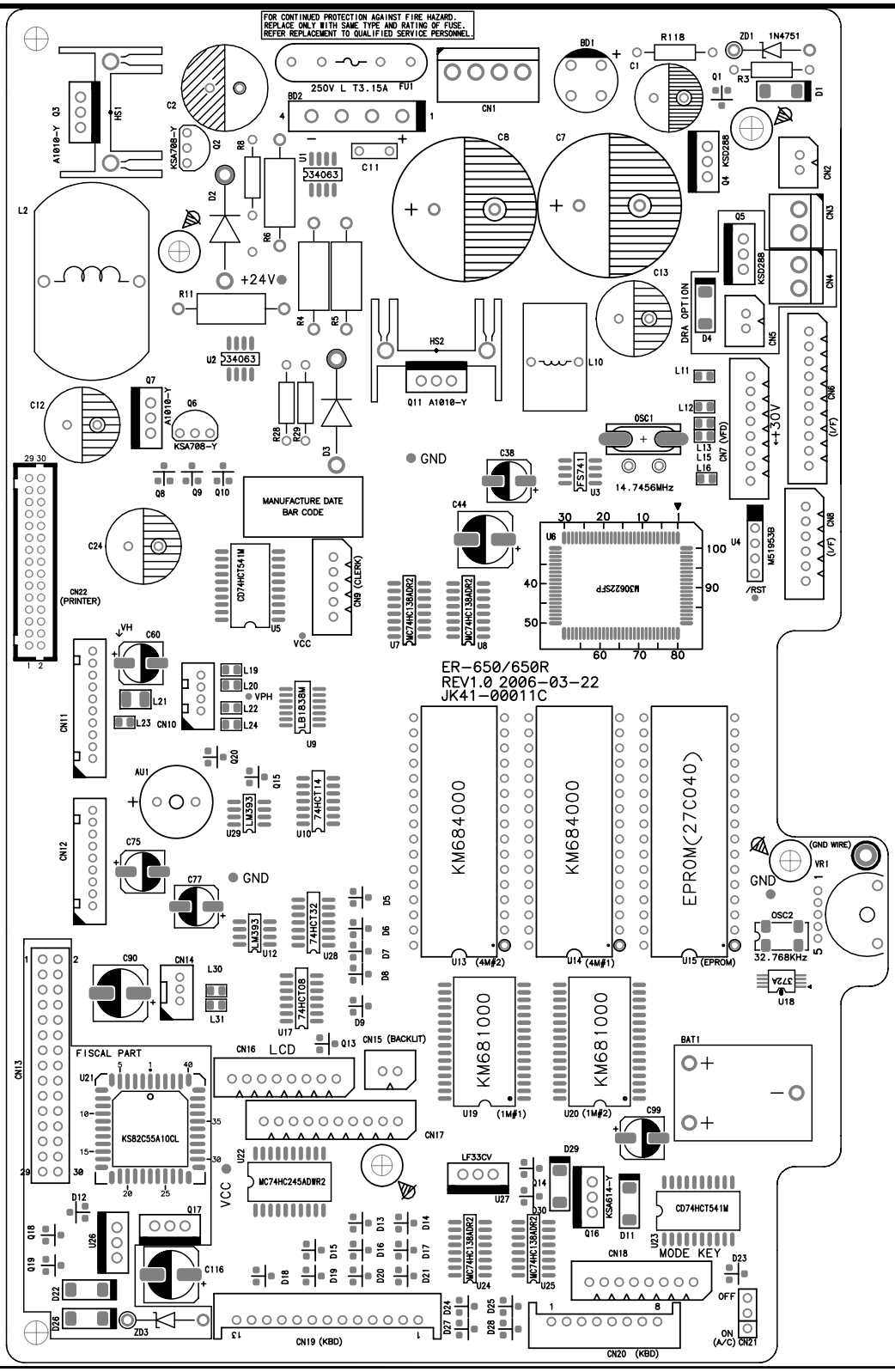
No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
d	JK97-00985A	MEA-UNIT LOCK: A-TYPE,2-LATCH,LONG LEVER	1		Y	
	JK97-00987A	MEA-UNIT LOCK: A-TYPE,2-LATCH,SHORT LEVER	1		Y	
d-1	6002-000157	SCREW-TAPPING: PH,+2,M4,L14,ZPC(YEL)	1		Y	
d-2	JK73-20210A	REX-BUMPER: DRAWER,NR,BLK	1		Y	
d-3	JK61-70100A	SPRING-PUSH: DRAWER,FZN	1		Y	
d-4	JK75-00027A	MEC-LOCK LEVER: A-TYPE,2-LATCH,LONG LEVER	1		N	
	JK75-00027B	MEC-LOCK LEVER: A-TYPE,2-LATCH,SHORT LEVER	1		N	
d-5	6107-001014	SPRING-ES: Φ0.4,D4.8,L18	1		Y	
d-6	JK33-10500A	SOLENOID-DC: A-DRAWER	1		Y	
d-7	6001-000131	SCREW-MACHINE: BH,+2,M3,L6,ZPC(YEL)	2		Y	
d-8	6001-000525	SCREW-MACHINE: PH,+2,M3,L14,ZPC(YEL)	2		Y	
d-9	3405-001013	SWITCH-MICRO: 125V,5A	1		Y	
d-10	JK39-40301R	CBF-HARNESS: 2P,150MM,BRN,1007	1		Y	
d-11	6002-000161	SCREW-TAPPING: PH,+2,M4,L8,ZPC(YEL)	3		Y	

(e) ASS'Y BOTTOM

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
e	JK97-01976A	MEA-UNIT BOTTOM: A-TYPE	1		N	
	JK97-01076B	MEA-UNIT BOTTOM: A-TYPE,UNIVERSAL	1		N	
e-1	JK70-10938A	IPR-PLATE BOTTOM: A-TYPE,SBHG-1,T1.0	1		N	
e-2	JK73-40200A	RMO-STOPPER: DRAWER,NR,BLK	2		N	
	JK73-10902A	RMO-STOPPER: DRAWER,NR,BLK,UNIVERSAL	2		N	
e-3	JK61-40200A	RMO-FOOT RUBBER: DRAWER,NR,GRAY,80HB	4		Y	
e-4	6002-000234	SCREW-TAPPING: TH,+2,M4,L16,ZPC(YEL)	4		Y	
e-5	6003-000267	SCREW-TAPTITE: PWH,+2,M3,L8,ZPC(YEL)	6		Y	
e-6	6003-000267	SCREW-TAPTITE: PWH,+2,M3,L8,ZPC(YEL)	2		Y	
e-7	JK70-10401A	IPR-PLATE SPRING: DRAWER,STS304,T0.3	2		Y	
e-8	6003-000267	SCREW-TAPTITE: PWH,+2,M3,L8,ZPC(YEL)	4		Y	

7 PBA Layout and Part List

7-1 Main PBA



7 PBA Layout and Part List

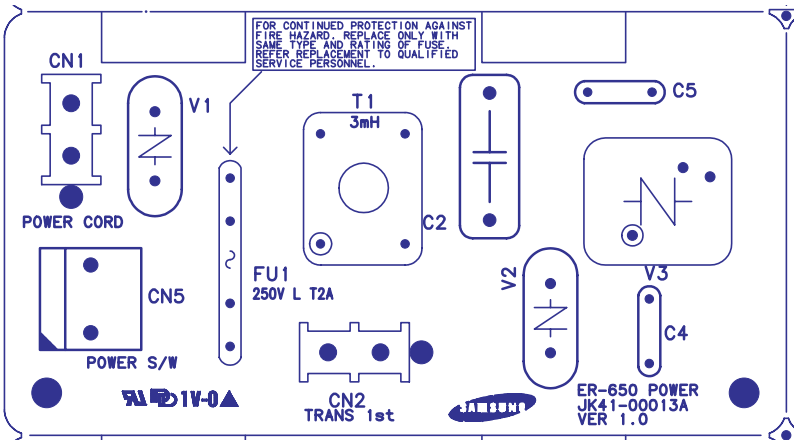
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-01470A	PBA MAIN-BOARD:ER-650R,EUROPE,RoHS	1	STANDARD	Y	SRAM: 2MBIT
	JK92-01470B	PBA MAIN-BOARD:ER-650R,4M_SRAM,RoHS	1	STANDARD	Y	SRAM: 10MBIT
	JK92-01470C	PBA MAIN-BOARD:ER-650R,CRS,RoHS	1	USA	Y	SRAM: 2MBIT
-	0402-000119	DIODE-BRIDGE:W02G,200V,1.5A,-,-	1	BD1	Y	
-	0402-000168	DIODE-RECTIFIER:1N5822,40V,3A,DO-201AD,T	2	D2,D3	Y	
-	0402-000290	DIODE-BRIDGE:KBU6B,100V,6A,-,BK	1	BD2	Y	
-	0403-000161	DIODE-ZENER:1N4751,30V,5%,1000MW,DO-41,T	1	ZD1	Y	
-	0501-000294	TR-SMALL SIGNAL:KSA708-Y,PNP,800mW,TO-92	2	Q2,Q6	Y	
-	0502-000234	TR-POWER:KSA1010Y,PNP,40W,TO-220,TP,100	1	Q7	Y	
-	0502-000288	TR-POWER:KSD288,NPN,25W,TO-220,-,120-24	2	Q4,Q5	Y	
-	0502-000240	TR-POWER:KSA614-Y,PNP,25W,TO-220,TP,120	1	Q16	Y	
-	1102-000161	IC-EPROM:27C040,512Kx8BIT,DIP,32P,600MI	1	U15	Y	
-	1106-000245	IC-SRAM:684000,512Kx8BIT,DIP,32P,600MI	2	U13,U14	Y	
-	1203-001752	IC-POSI.FIXED REG.:LF33CV,TO-220,3P,-,PL	1	U27	Y	
-	1209-001089	IC-DETECTOR:M51953B,SIP,5P,-,PLASTIC,18V	1	U4	Y	
-	2001-000027	R-CARBON:100OHM,5%,1/4W,AA,TP,2.4X6.4MM	1	R118	Y	
-	2001-000065	R-CARBON:10KOHM,5%,1/4W,AA,TP,2.4X6.4MM	1	R3	Y	
-	2001-000119	R-CARBON:680OHM,5%,1/4W,AA,TP,2.4X6.4MM	1	R28	Y	
-	2001-000855	R-CARBON:560OHM,5%,1/4W,AA,TP,2.4X6.4MM	2	R8,R29	Y	
-	2003-000003	R-METAL OXIDE(S):75ohm,5%,2W,AA,TP,4x12m	1	R6	Y	
-	2005-000419	R-WIRE WOUND,NON:0.33ohm,1%,1W,AA,TP,4.3	1	R11	Y	
-	2005-001001	R-WIRE WOUND:0.1ohm,5%,1W,AA,TP,3.3x9mm	2	R4,R5	Y	
-	2101-001023	VR-ROTARY:10Kohm,30%,0.03W,BUTTOM,-	1	VR1	Y	
-	2301-000010	C-FILM,PEF:100nF,5%,100V,TP,11.5x12.5mm,	1	C11	Y	
-	2401-000032	C-AL:100uF,20%,50V,GP,TP,8x12,5mm	1	C1	Y	
-	2401-001312	C-AL:4700uF,20%,50V,GP,BK,22x40,10	2	C7,C8	Y	
-	2401-001363	C-AL:470uF,20%,16V,GP,TP,10x12.5,5	3	C12,C13,C24	Y	
-	2401-001429	C-AL:470uF,20%,50V,GP,TP,13x20,5	1	C2	Y	
-	2801-003382	CRYSTAL-SMD:14.7456MHZ,SX-1,18pF	1	OSC1	Y	
-	3002-001027	BUZZER-PIEZO:85dB,1.5V,24mA,2.048KHz,BK	1	AU1	Y	
-	3601-000261	FUSE-CARTRIDGE:250V,3.15A,TIME-LAG,GLASS	1	FU1	Y	
-	3602-000001	FUSE-CLIP:-,-,30mohm	2	FU1	Y	
-	3704-000255	SOCKET-IC:32P,DIP,SN,2.54mm	3	U13,U14,U15	Y	
-	3708-000327	CONNECTOR-FPC/FFC/PIC:8P,2.54mm,STRAIGHT	1	CN20	Y	
-	3708-001389	CONNECTOR-FPC/FFC/PIC:13P,2.54MM,STRAIGH	1	CN19	Y	
-	3711-000033	CONNECTOR-HEADER:BOX,2P,1R,2.5mm,STRAIG	1	CN15	Y	
-	3711-000041	CONNECTOR-HEADER:BOX,8P,1R,2.5mm,STRAIG	1	CN7	Y	
-	3711-000183	CONNECTOR-HEADER:1WALL,2P,1R,3.96mm,STR	2	CN3,CN4	Y	
-	3711-000242	CONNECTOR-HEADER:1WALL,4P,1R,3.96mm,STR	1	CN1	Y	
-	3711-000840	CONNECTOR-HEADER:BOX,30P,2R,2MM,STRAIGH	1	CN22	Y	
-	3711-001054	CONNECTOR-HEADER:BOX,6P,1R,2.5mm,STRAIG	1	CN8	Y	
-	3711-001133	CONNECTOR-HEADER:BOX,8P,1R,2.5mm,STRAIG	2	CN16,CN18	Y	
-	3711-003359	CONNECTOR-HEADER:BOX,10P,1R,2.5mm,STRAIG	2	CN6,CN17	Y	
-	3711-003969	CONNECTOR-HEADER:BOX,2P,1R,2.5mm,STRAIG	2	CN2,CN5	Y	
-	3711-001011	CONNECTOR-HEADER:BOX,5P,1R,2.5mm,STRAIG	1	CN9	Y	
-	4302-000126	BATTERY-NICD(2ND):3.6V(1.2Vx3),60mAH,CYL	1	BAT1	Y	
-	JK27-60100B	COIL FILTER:SER-6500,220 UH,-,-	1	L2	Y	
-	JK27-60100D	COIL FILTER:ER-350,140 UH,-,-	1	L10	Y	

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK39-40541A	CBF HARNESS-MAIN:ER-4615,1R,UL1015,220mm	1	MAIN+GND_PLATE	Y	
-	0502-000234	TR-POWER:KSA1010Y,PNP,40W,TO-220,TP,100	2	Q3,Q11	Y	
-	6003-000119	SCREW-TAPTITE:BH M3x8 BLK	2	Q3,Q11	Y	
-	6203-000107	HEAT SINK:NONE,T2,W17,L22,H45,DEGRE,AL60	2	Q3,Q11	Y	
-	0801-000523	IC-CMOS LOGIC:74HCT541,BUFFER/DRIVER,SOP	2	U5,U23	Y	
-	0801-000642	IC-CMOS LOGIC:74HC138,3-TO-8 DECODER,SOP	4	U7,U8,U24,U25	Y	
-	0801-000696	IC-CMOS LOGIC:74HC245,TRANSCEIVER,SOP,20	1	U22	Y	
-	0801-000887	IC-CMOS LOGIC:74HCT08,AND GATE,SOP,14P,1	1	U17	Y	
-	0801-001090	IC-CMOS LOGIC:74HC14,SCHIMITT INVERTER,S	1	U10	Y	
-	0903-001154	IC-MICROCOMPUTER:30622,16BIT,QFP,100P,-,	1	U6	Y	
-	**0909-000137**	**IC-REAL TIME CLOCK:RS5C372A-E2-F,SSOP,8P**	**1**	**U18 (Serial RTC)**	Y	
-	1003-001234	IC-MOTOR DRIVER:LB1838M,SOP,14P,173MIL,S	1	U9	Y	
-	1106-000131	IC-SRAM:681000,128Kx8BIT,SOP,32P,525MI	2	U19,U20	Y	
-	1202-000164	IC-VOLTAGE COMP.:393,SOP,8P,150MIL,DUAL,	1	U29	Y	
-	1203-000404	IC-DC/DC CONVERTER:34063,SOP,8P,150MIL,P	2	U1,U2	Y	
-	4701-001020	IC-FREQ-ATTENUATOR:5-80MHz,15dB,-,0.03W	1	U3	Y	
-	0801-000891	IC-CMOS LOGIC:74HCT32,OR GATE,SOP,14P,15	1	U28	Y	
-	1202-000164	IC-VOLTAGE COMP.:393,SOP,8P,150MIL,DUAL,	1	U12	Y	
-	2801-000111	CRYSTAL-SMD:32.768KHz,20ppm,28-AAW,20pF,	1	OSC2	Y	
-	0401-001003	DIODE-SWITCHING:MMBD6050LT1,70V,200mA,22	20	D30,D9,D5,D18,D19,D16,D24 D13,D6,D21,D7,D23,D28,D14 D27,D15,D25,D8,D17,D20	Y	
-	0402-001189	DIODE-RECTIFIER:M4,400V,1A,SMD-2,TP	2	D1,D4	Y	
-	0404-001051	DIODE-SCHOTTKY:SK14,40V,1000MA,DO-214AA,	2	D11,D29	Y	
-	0501-000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT-	8	Q13,Q9,Q15,Q14,Q20,Q8 Q10,Q1	Y	
-	2007-000001	R-CHIP:68KOHM,5%,1/10W,DA,TP,2012	3	R120,R121,R122	N	
-	2007-000026	R-CHIP:200OHM,5%,1/10W,DA,TP,2012	4	R7,R16,R41,R93	N	
-	2007-000221	R-CHIP:1.2KOHM,5%,1/10W,DA,TP,2012	1	R70	N	
-	2007-000254	R-CHIP:1.62KOHM,1%,1/10W,DA,TP,2012	1	R68	N	
-	2007-000290	R-CHIP:100OHM,5%,1/10W,DA,TP,2012	2	R43,R94	N	
-	2007-000300	R-CHIP:10KOHM,5%,1/10W,DA,TP,2012	19	R96,R99,R107,R111,R25 R106,R31,R98,R101,R34 R105,R91,R21,R95,R30,R35 R18,R102,R36	N	
-	2007-000308	R-CHIP:10OHM,5%,1/10W,DA,TP,2012	1	R40	N	
-	2007-000352	R-CHIP:12KOHM,1%,1/10W,DA,TP,2012	1	R19	N	
-	2007-000395	R-CHIP:150KOHM,5%,1/10W,DA,TP,2012	2	R65,R66	N	
-	2007-000653	R-CHIP:27KOHM,5%,1/10W,DA,TP,2012	1	R13	N	
-	2007-000457	R-CHIP:18KOHM,5%,1/10W,DA,TP,2012	1	R15	N	
-	2007-000468	R-CHIP:1KOHM,5%,1/10W,DA,TP,2012	10	R20,R110,R1,R82,R119,R2 R72,R77,R97,R86	N	
-	2007-000493	R-CHIP:2.2KOHM,5%,1/10W,DA,TP,2012	6	R88,R92,R76,R37,R84,R81	N	
-	2007-000686	R-CHIP:3.3KOHM,5%,1/10W,DA,TP,2012	2	R80,R90	N	
-	2007-000872	R-CHIP:4.7KOHM,5%,1/10W,DA,TP,2012	42	R12,R42,R52,R60,R63,R103 R45,R62,R64,R55,R58,R33 R51,R50,R59,R57,R73,R32 R39,R78,R83,R46,R48,R71 R113,R54,R125,R74,R26 R47,R85,R56,R9,R14,R44 R38,R114,R61,R53,R49 R200,R201	N	
-	2007-000941	R-CHIP:47KOHM,5%,1/10W,DA,TP,2012	1	R27	N	
-	2007-001071	R-CHIP:6.8KOHM,5%,1/10W,DA,TP,2012	1	R67	N	
-	2007-001113	R-CHIP:680KOHM,5%,1/10W,DA,TP,2012	1	R123	N	
-	2007-001118	R-CHIP:680OHM,5%,1/10W,DA,TP,2012	1	R124	N	
-	2007-001662	R-CHIP:36KOHM,1%,1/10W,DA,TP,2012	2	R17,R23	N	

7 PBA Layout and Part List

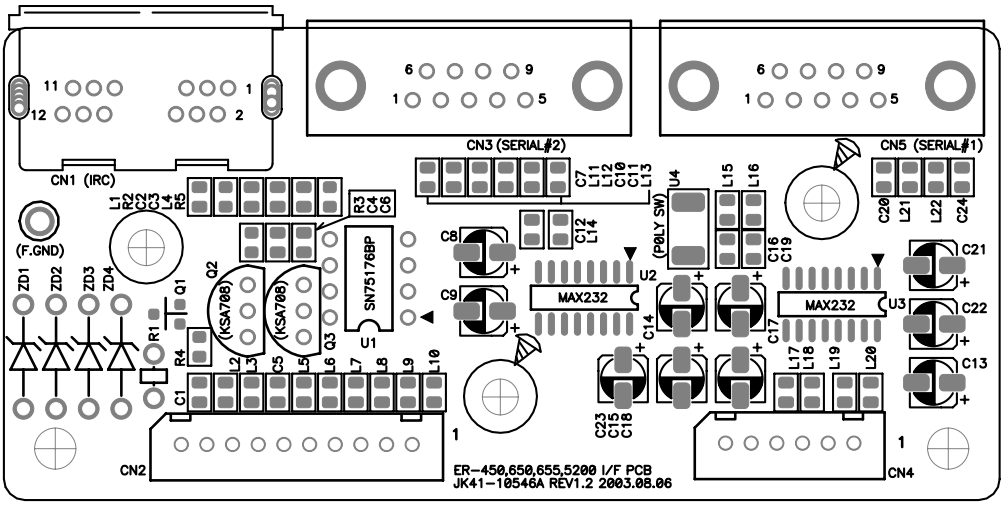
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	2007-000406	R-CHIP:15KOHM,1%,1/10W,DA,TP,2012	1	R22	N	
-	2007-001152	R-CHIP:750OHM,1%,1/10W,DA,TP,2012	1	R24	N	
-	2007-000642	R-CHIP:270OHM,5%,1/10W,DA,TP,2012	1	R89	N	
-	2007-001013	R-CHIP:51OHM,5%,1/10W,DA,TP,2012	1	R104	N	
-	2203-000192	C-CERAMIC,CHIP:100nF,+80-20%,50V,Y5V,TP,	46	C71,C108,C69,C62,C39,C93 C18,C29,C82,C86,C87,C98 C79,C103,C110,C112,C21 C4,C65,C30,C53,C5,C95,C55 C26,C31,C47,C81,C51,C28 C96,C105,C97,C117,C118 C6,C16,C10,C17,C3,C46,C84 C122,C80,,C45,C15	N	
-	2203-000239	C-CERAMIC,CHIP:0.1nF,5%,50V,NP0,TP,2012	22	C83,C67,C102,C111,C91 C73,C89,C104,C66,C68,C70 C72,C100,C64,C94,C113 C63,C109,C92,C107,C61 C106	N	
-	2203-000260	C-CERAMIC,CHIP:10nF,10%,50V,X7R,TP,2012	4	C36,C40,C57,C74	N	
-	2203-000634	C-CERAMIC,CHIP:0.022nF,5%,50V,NP0,TP,201	3	C27,C32,C33	N	
-	2203-000748	C-CERAMIC,CHIP:0.03nF,5%,50V,NP0,TP,2012	13	C35,C37,C58,C41,C49,C50 C52,C54,C59,C42,C43 C9,C56	N	
-	2203-000938	C-CERAMIC,CHIP:0.47nF,5%,50V,NP0,TP,2012	9	C22,C23,C121,C34,C25,C14 C20,C48,C19	N	
-	2402-000168	C-AL,SMD:100uF,20%,16V,GP,TP,8.3x8.3x6.3	3	C44,C90,C116	Y	
-	2402-000179	C-AL,SMD:47uF,20%,16V,GP,TP,6.6x6.6x5.4	2	C60,C75	Y	
-	2402-000139	C-AL,SMD:22uF,20%,35V,GP,TP,6.6x6.6x5.4	2	C38,C99	Y	
-	2402-000117	C-AL,SMD:10uF,20%,35V,GP,TP,5.3x5.3x5.4	1	C77	Y	
-	3301-000325	CORE-FERRITE BEAD:AB,3.2x2.5x1.3mm,-,-	28	L53,L44,L51,L56,L57,L37 L50,L41,L42,L47,L39,L4,L14 L40,L46,L17,L54,L45,L55 L52,L6,L5,L21,L48,L43,L38 L7,L49	N	
-	3301-000317	CORE-FERRITE BEAD:AB,2x1.25x0.9mm,-,-	22	L8,L29,L19,L18,L26,L24,L1 L22,L16,L12,L13,L31,L23 L30,L25,L28,L27,L11,L9,L3 L15,L20	N	
-	**JK41-00011C**	**PCB-MAIN:ER-650/R,FR-4,2L,T1.6mm,RoHS**	**1**	**Serial RTC**	N	

7-2 Power Filter PCB Layout



No	Code No.	Description / Specification	Q'TY	Design-Location	Serviceable	Remarks
-	JK92-00949A	PBA PWR-650;ER-650,BASIC,WORLD	1		Y	
-	1405-000111	VARISTOR;1800V,4500A,17.5x15mm	1	V3	Y	
-	1405-000147	VARISTOR;470V,4500A,17x12mm,BK	2	V1,2	Y	
-	2201-000023	C-CERAMIC,DISC;2.2nF,20%,125V,	1	C4,5	Y	
-	2305-001021	C-FILM,MPEF;100nF,20%,275V,TP,	1	C2	Y	
-	3601-000246	FUSE-FERRULE;250V,2A,TL,GLASS,	1	FU1	Y	
-	3602-000001	FUSE-CLIP;-,-,30mohm	2	FU1	Y	
-	3711-000829	CONNECTOR-HEADER;BOX,2P,1R,6.2	1	CN2	Y	
-	3711-000829	CONNECTOR-HEADER;BOX,2P,1R,6.2	1	CN1	Y	
-	3711-002104	CONNECTOR-HEADER;1WALL,2P,1R,7	1	CN5	Y	
-	JC27-60503A	COIL FILTER-3mH;ML5500,3.0mH,0	1	T1	Y	
-	JK41-00013A	PCB-650 POWER;ER-650,FR-1,1L,T	1		N	

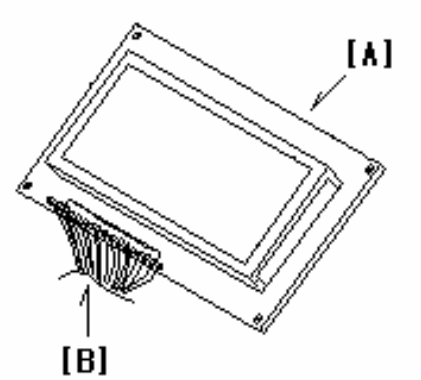
7-3 RS-232C and IRC PCB Layout



No.	Parts No.	Description / Specification	Q`ty	Design- Location	Serviceable	Remark
-	JK92-00948D	PBA SUB-I/F 232/IRC:ER-650/655/650R,STD	1	ASSY	Y	
-	1006-000259	IC-LINE TRANSCEIVER:75176A,DIP,8P,300MIL	1	U1	Y	
-	3701-000232	CONNECTOR-DSUB:9P,2R,FEMALE,ANGLE,AUF	2	CN3,CN5	Y	
-	3711-003359	CONNECTOR-HEADER:BOX,10P,1R,2.5mm,STRAIG	1	CN2	Y	
-	3711-001054	CONNECTOR-HEADER:BOX,6P,1R,2.5mm,STRAIGH	1	CN4	Y	
-	3722-000001	JACK-MODULAR:12P/2C,-,AU,GRAY,-	1	CN1	Y	
-	0403-000141	DIODE-ZENER:1N4735A,6.2V,5%,1W,DO-41,TP	4	ZD1,ZD2,ZD3,ZD4	Y	
-	3301-000344	CORE-FERRITE BEAD:AA,3.5x0.6x6.5mm,DUAL	1	R1	Y	
-	0501-000294	TR-SMALL SIGNAL:KSA708-Y,PNP,800mW,TO-92	2	Q2,Q3	Y	
-	1006-000133	IC-DRIVER/RECEIVER:232,SOP,16P,150MIL,DU	2	U2,U3	Y	
-	2203-000192	C-CERAMIC,CHIP:100nF,+80-20%,50V,Y5V,TP,	2	C4,C6	N	
-	2203-000938	C-CERAMIC,CHIP:0.47nF,5%,50V,NP0,TP,2012	8	C7,C10,C11,C12,C16,C1,	N	
-				C20,C24		
-	2402-000170	C-AL,SMD:1uF,20%,50V,GP,TP,4.3x4.3x5.4,	10	C8,C9,C13,C14,C15,C17,	Y	
-				C18,C21,C22,C23		
-	2203-000495	C-CERAMIC,CHIP:2.2nF,10%,50V,X7R,TP,2012	2	C2,C3	N	
-	2203-000784	C-CERAMIC,CHIP:0.33nF,5%,50V,NP0,TP,2012	2	C1,C5	N	
-	3301-000317	CORE-FERRITE BEAD:AB,2x1.25x0.9mm,-,-	20	L2,L3,L5,L6,L7,L8,L9,L10,	N	
-				L11,L12,L13,L14,L15,L16,		
-				L17,L18,L19,L20,L21,L22		
-	0501-000279	TR-SMALL SIGNAL:KSA1182-Y,PNP,150mW,SOT-	1	Q1	Y	
-	2007-000931	R-CHIP:470OHM,5%,1/8W,DA,TP,2012	1	R3	N	
-	2007-000872	R-CHIP:4.7KOHM,5%,1/10W,DA,TP,2012	3	R2,R4,R5	N	
-	2007-001013	R-CHIP:51OHM,5%,1/10W,DA,TP,2012	2	L1,L4	N	
-	JK41-10546A	PCB-I/O:ER-650/5200,FR-4,2L,T1.6,97*46mm	1		N	

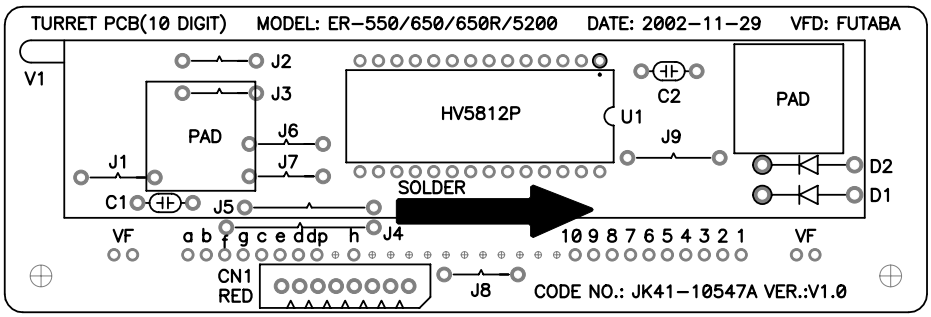
7-4 Display Layout

7-4 A. Parts List (Front LCD)



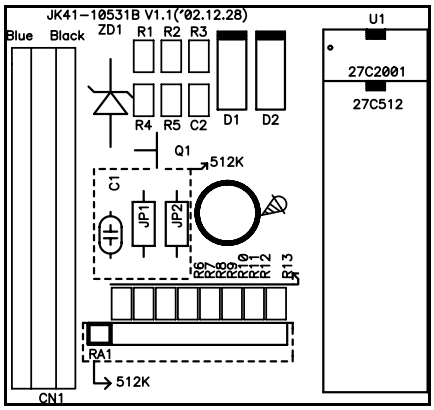
No	Code No.	Description / Specification	Q'TY	Design-Location	Serviceable	Remarks
-	**JK96-01080A**	**ELA ETC-DISPLAY(650);ER-650,BA**	1	ASS'Y	Y	
-	JK07-20100A	DISPLAY-LCD;ER-550,PG12864LRS-	1	[A]	Y	
-	JK39-40305Y	CBF-HARNESS;18P,450MM,RED/WHT,	1	[B] 8P/10P	Y	
-	JK39-40305Z	CBF-HARNESS;2P,500MM,RED/WHT,U	1	[B] 2P	Y	

7-4 B. Parts List (Rear VFD)



No	Code No.	Description / Specification	Q'TY	Design-Location	Serviceable	Remarks
-	JK92-00970A	PBA SUB-650,TURRET:ER-650,BASIC	1	ER-650	Y	
-	0402-000129	DIODE-RECTIFIER;1N4003,200V,1A	1	D1	Y	
-	0402-000208	DIODE-RECTIFIER:EK-04,40V,1.5A,DO-41	1	D2	Y	
-	2202-000579	C-CERAMIC,MLC-AXIAL:100nF,+80-20%,50V,Z5	2	C1,C2	Y	
-	1003-001381	IC-VFD:HV5812P,DIP,28P,540MIL,-,-,ST,PLA	1	U1	Y	
-	3711-001133	CONNECTOR-HEADER;BOX,8P,1R,2,5	1	CN1	Y	
-	JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	9	J1 ~ J9	Y	
-	JK07-00005A	DISPLAY VFD-DC10G:FUTABA,10-LT-50GK	1	V1	Y	
-	JK39-00042A	CBF HARNESS-TURRET(WITH TUBE);	1	TURRET TO MAIN	Y	
-	JK41-10547A	PCB-TURRET:ER-650/5200,FR-1,1L,T1.6	1		N	
-	JK73-10207A	RPR-PAD;ER-220N,SPONGE,-,BLK,-	2	T5.0	Y	

7-5 Fiscal Layout



(Memory Size = 1MBITs)

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-00132B	PBA SUB-FISCAL B/D;1MBITs	1	1MBITs ASSY	Y	
-	1102-000109	IC-EPROM:27C010,128Kx8BIT,DIP,32P,600MI	1	U1	Y	
-	0403-000141	DIODE-ZENER:1N4735A,6.2V,5%,1W,DO-41,TP	1	ZD1	Y	
-	JK39-40305B	CBF HARNESS:,-,UL 1007,120,WHT/BLU/RED,2	1	CN1	Y	
-	2007-000029	R-CHIP:0OHM,5%,1/10W,DA,TP,2012	1	R3	N	
-	2007-000030	R-CHIP:560OHM,5%,1/10W,DA,TP,2012	1	R2	N	
-	2007-000221	R-CHIP:1.2KOHM,5%,1/10W,DA,TP,2012	1	R4	N	
-	2007-000872	R-CHIP:4.7KOHM,5%,1/10W,DA,TP,2012	10	R1,R5~R13	N	
-	2203-000192	C-CERAMIC,CHIP:100nF,+80-20%,50V,Y5V,TP,	1	C2	N	
-	0404-001051	DIODE-SCHOTTKY:SK14,40V,1000MA,DO-214AA,	2	D1,D2	Y	
-	0501-000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT-	1	Q1	Y	
-	JK41-10531B	PCB-FISCAL:ER-5240F,FR-4,2L,T1.6mm,348X5	1		N	

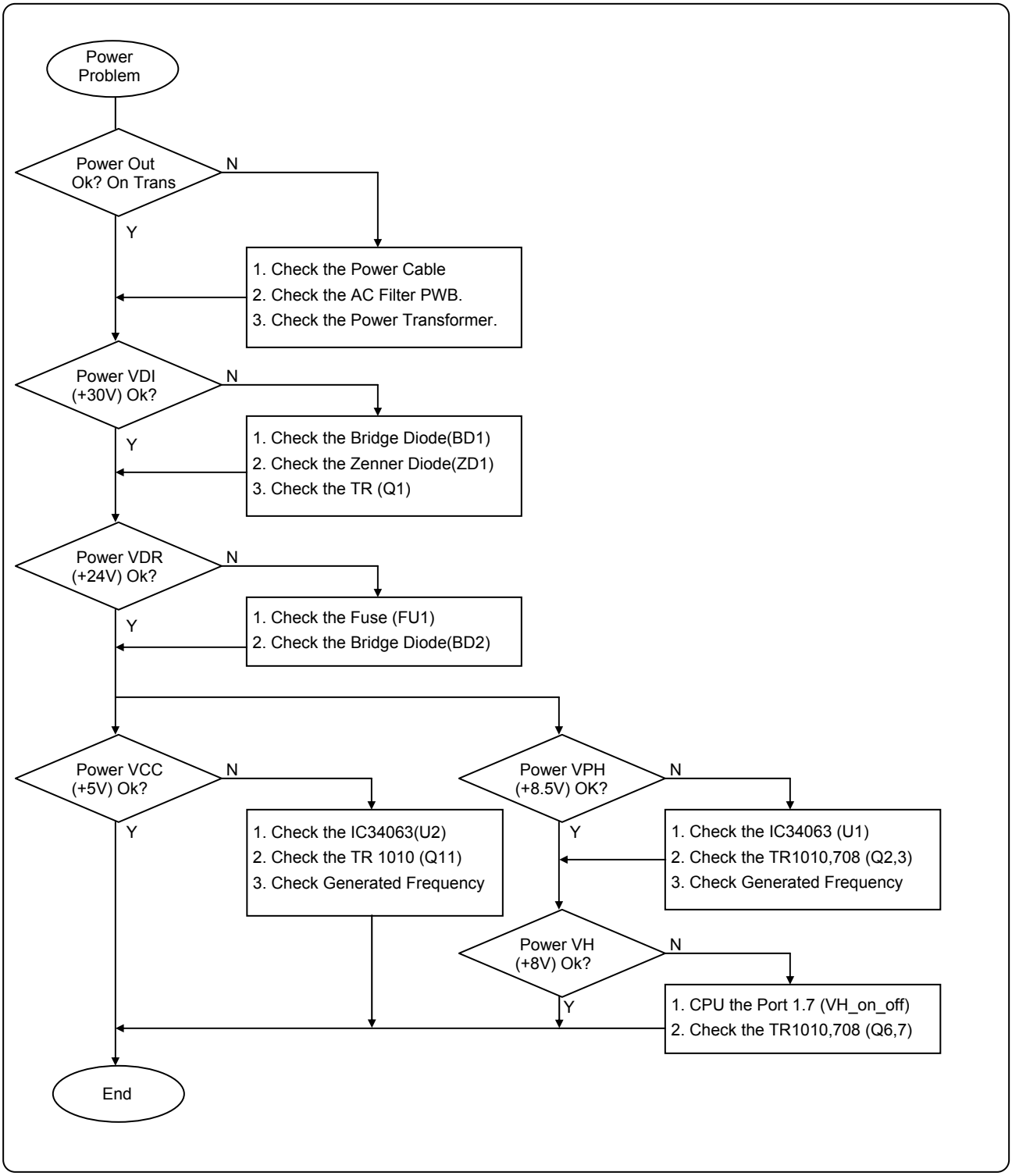
(Memory Size = 2MBITs)

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	JK92-00132C	PBA SUB-FISCAL B/D;2MBITs	1	2MBITs ASSY	Y	
-	1102-000136	IC-EPROM:27C020,256Kx8BIT,DIP,32P,600MI	1	U1	Y	
-	0403-000141	DIODE-ZENER:1N4735A,6.2V,5%,1W,DO-41,TP	1	ZD1	Y	
-	JK39-40305B	CBF HARNESS:,-,UL 1007,120,WHT/BLU/RED,2	1	CN1	Y	
-	2007-000029	R-CHIP:0OHM,5%,1/10W,DA,TP,2012	1	R3	N	
-	2007-000030	R-CHIP:560OHM,5%,1/10W,DA,TP,2012	1	R2	N	
-	2007-000221	R-CHIP:1.2KOHM,5%,1/10W,DA,TP,2012	1	R4	N	
-	2007-000872	R-CHIP:4.7KOHM,5%,1/10W,DA,TP,2012	10	R1,R5~R13	N	
-	2203-000192	C-CERAMIC,CHIP:100nF,+80-20%,50V,Y5V,TP,	1	C2	N	
-	0404-001051	DIODE-SCHOTTKY:SK14,40V,1000MA,DO-214AA,	2	D1,D2	Y	
-	0501-000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT-	1	Q1	Y	
-	JK41-10531B	PCB-FISCAL:ER-5240F,FR-4,2L,T1.6mm,348X5	1		N	

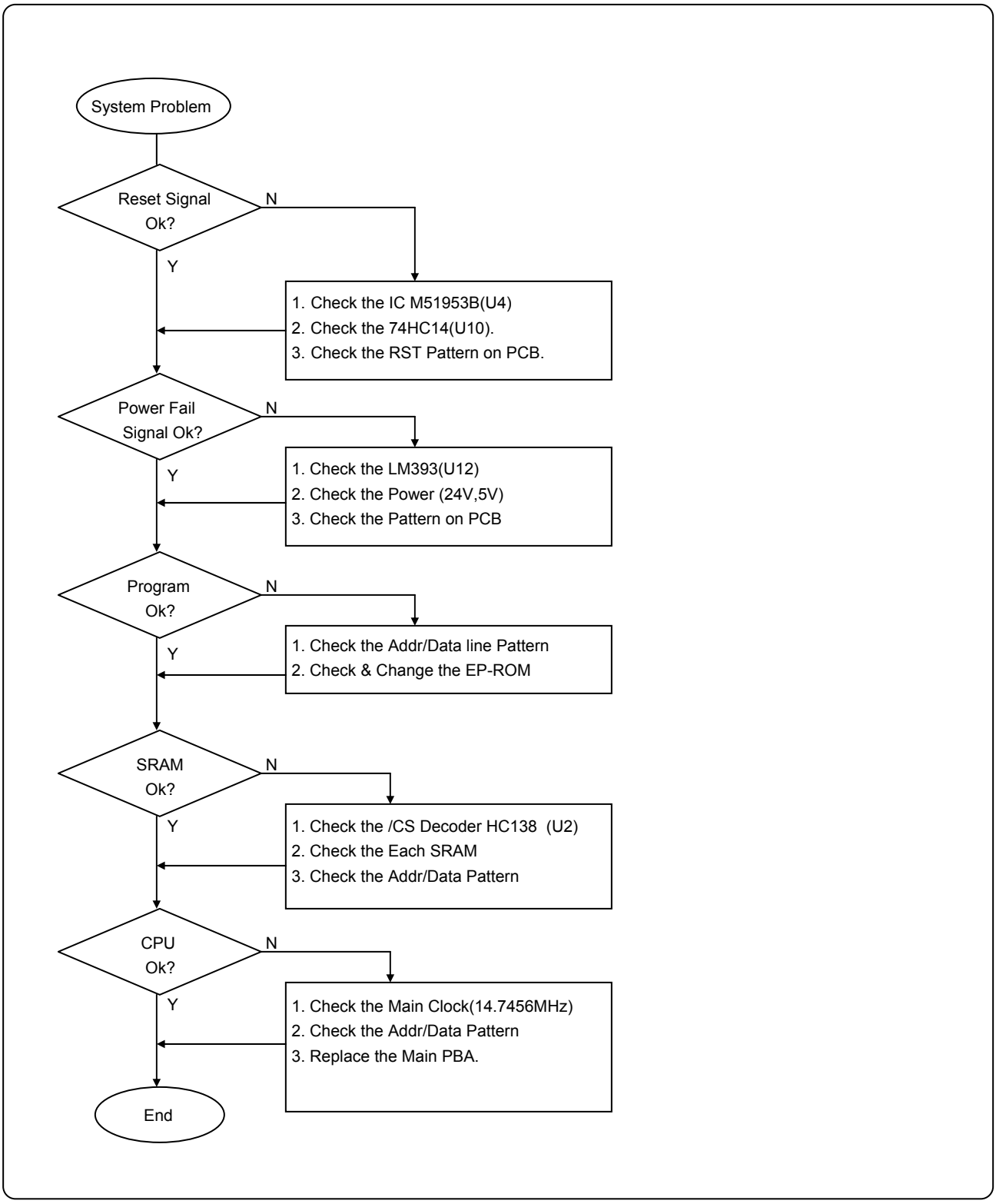
MEMO

8 Trouble Shooting

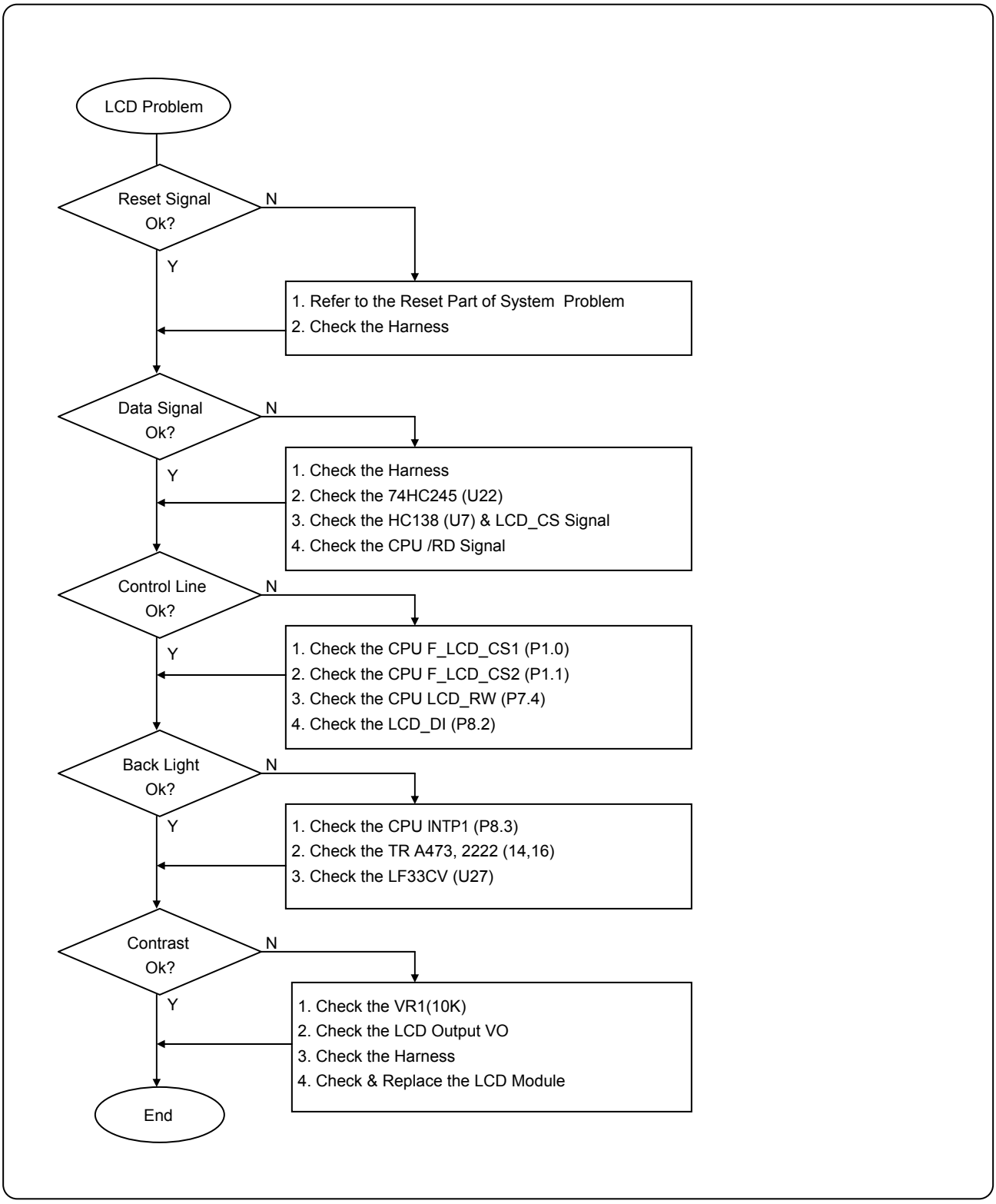
8-1 Power Problem



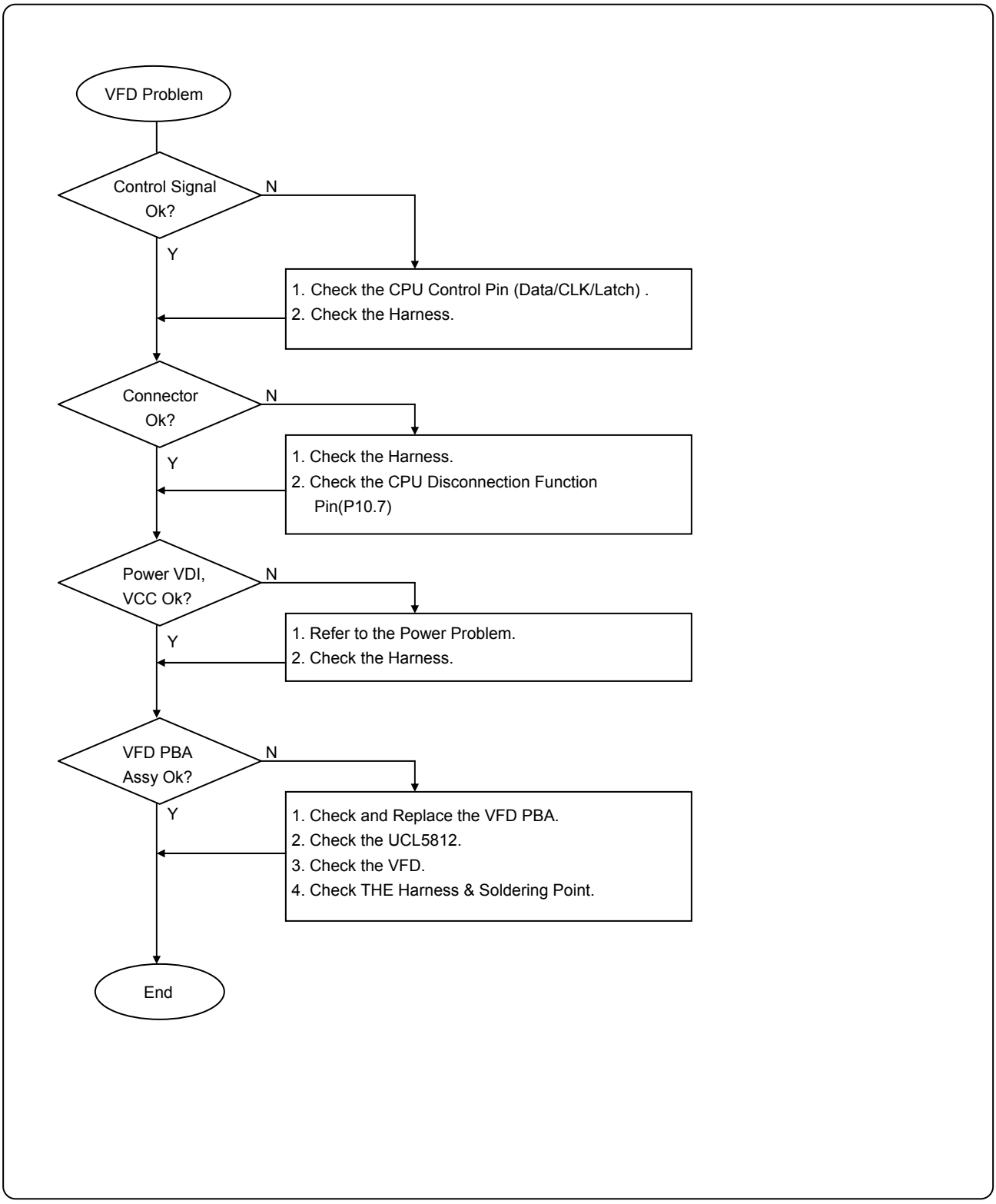
8-2 System Problem



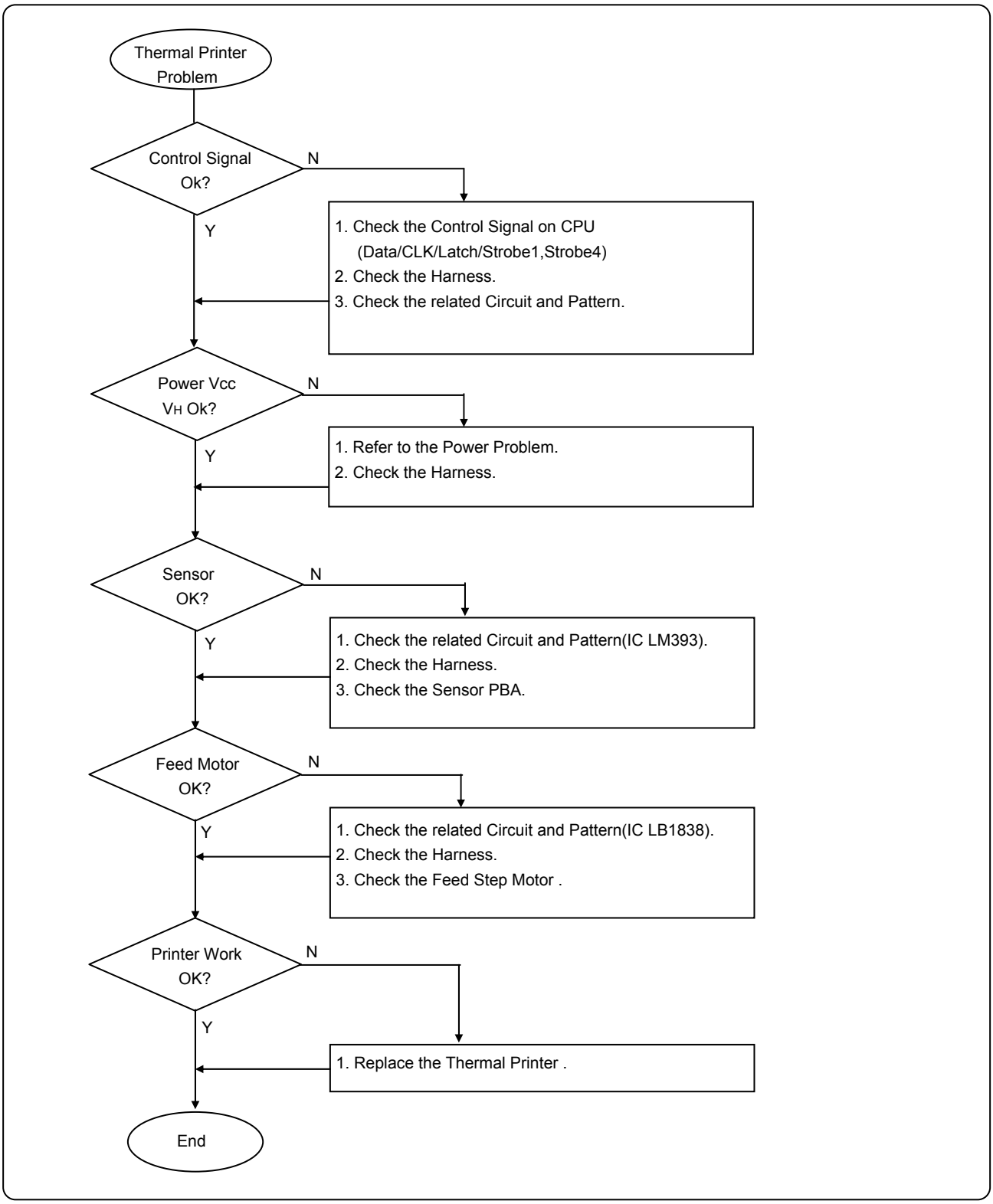
8-3 LCD Display Problem



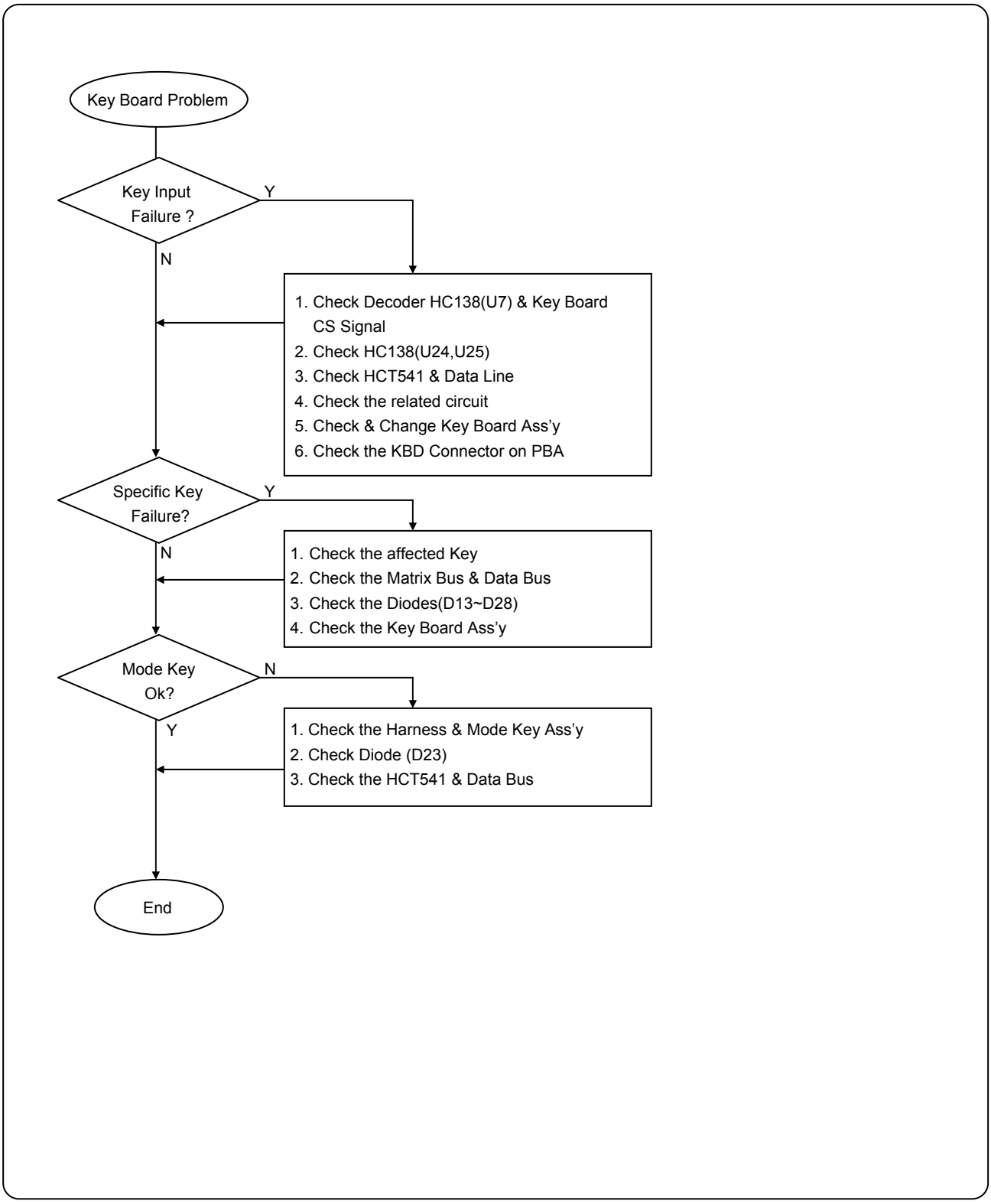
8-4 VFD Display Problem



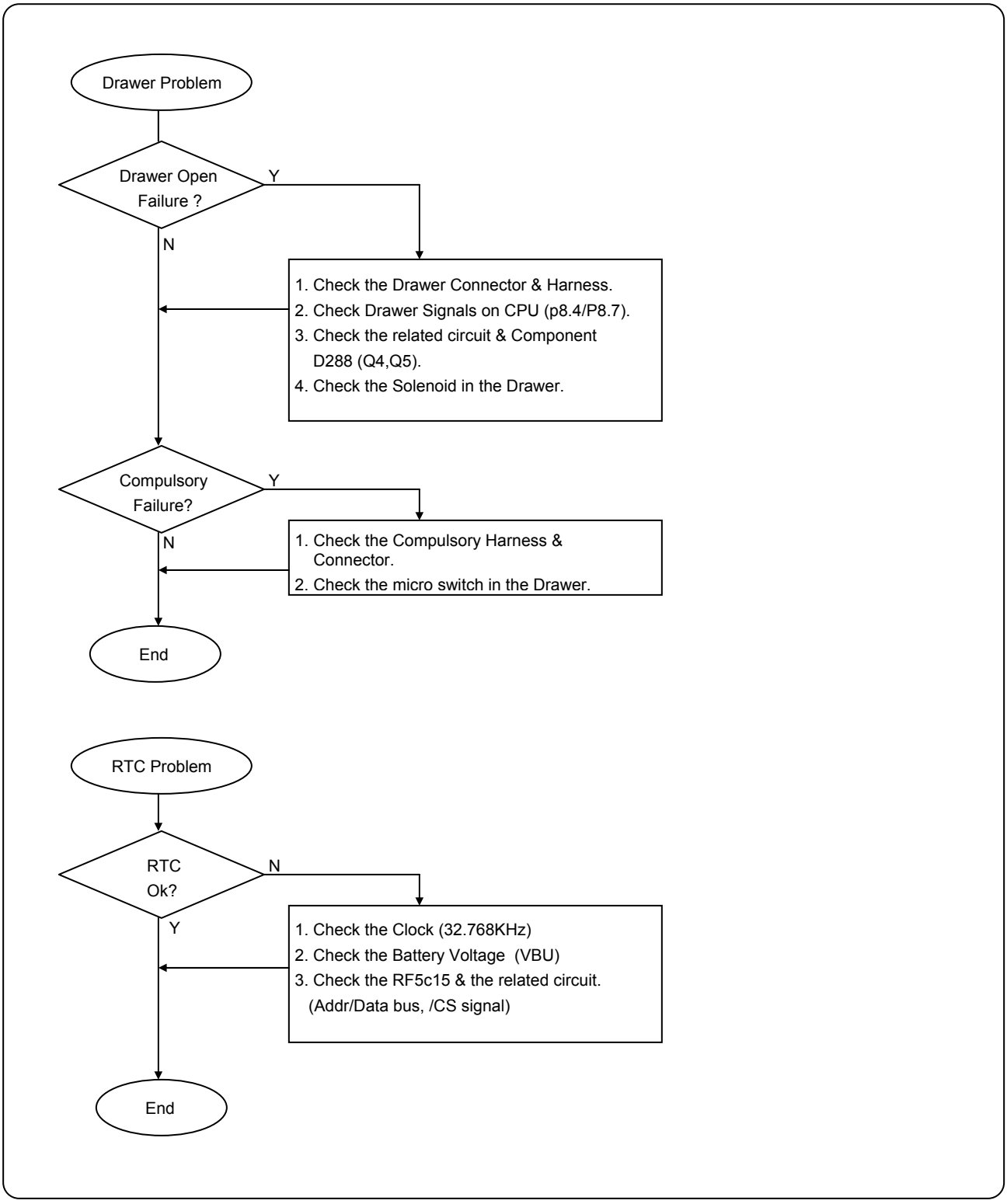
8-5 Thermal Printer Problem



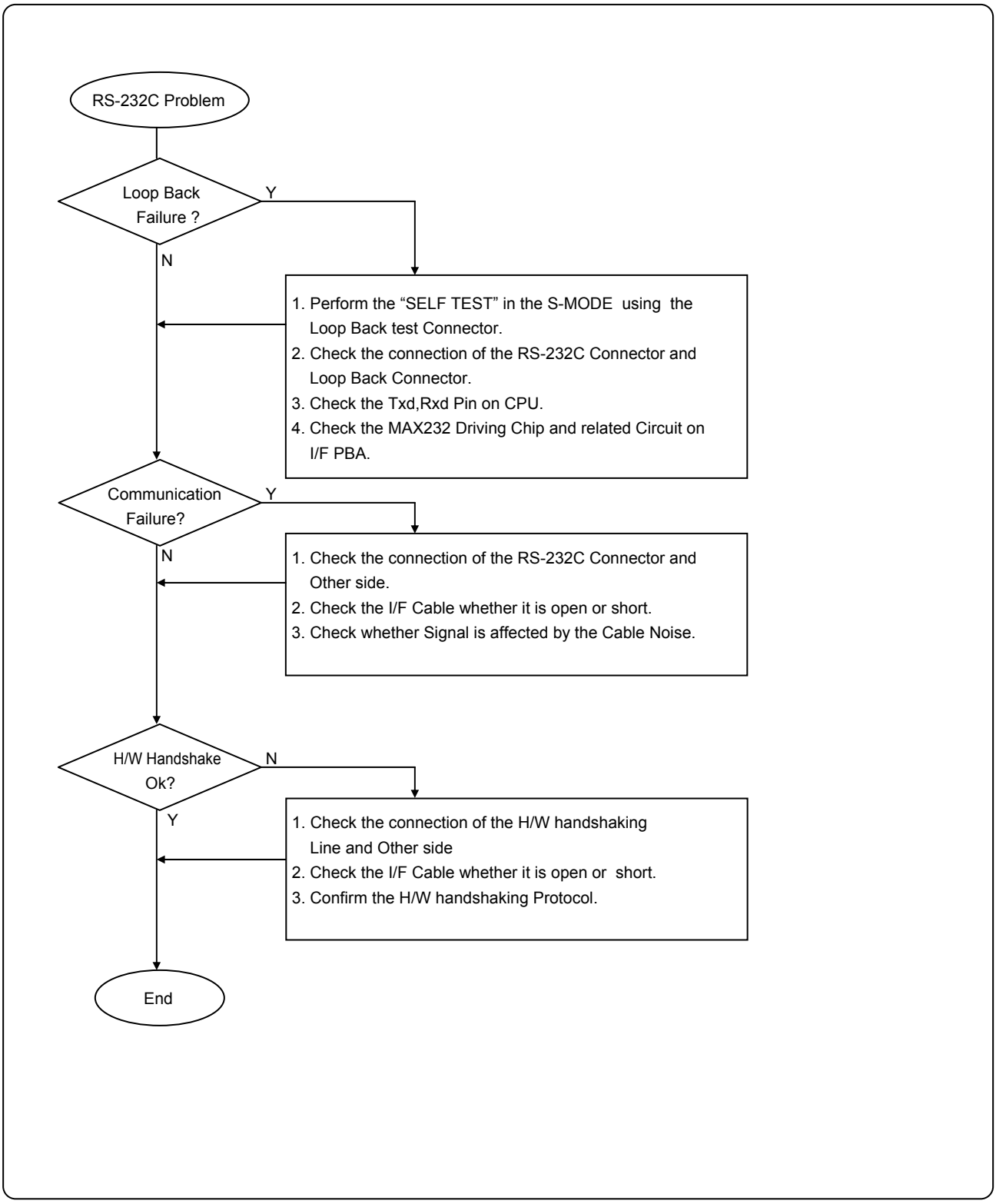
8-6 Key Board Problem


Key Board Problem
Key Input Failure ?
Y
N
1. Check Decoder HC138(U7) & Key Board CS Signal
2. Check HC138(U24,U25)
3. Check HCT541 & Data Line
4. Check the related circuit
5. Check & Change Key Board Ass'y
6. Check the KBD Connector on PBA
Specific Key Failure?
Y
N
1. Check the affected Key
2. Check the Matrix Bus & Data Bus
3. Check the Diodes(D13~D28)
4. Check the Key Board Ass'y
Mode Key Ok?
N
Y
1. Check the Harness & Mode Key Ass'y
2. Check Diode (D23)
3. Check the HCT541 & Data Bus
End

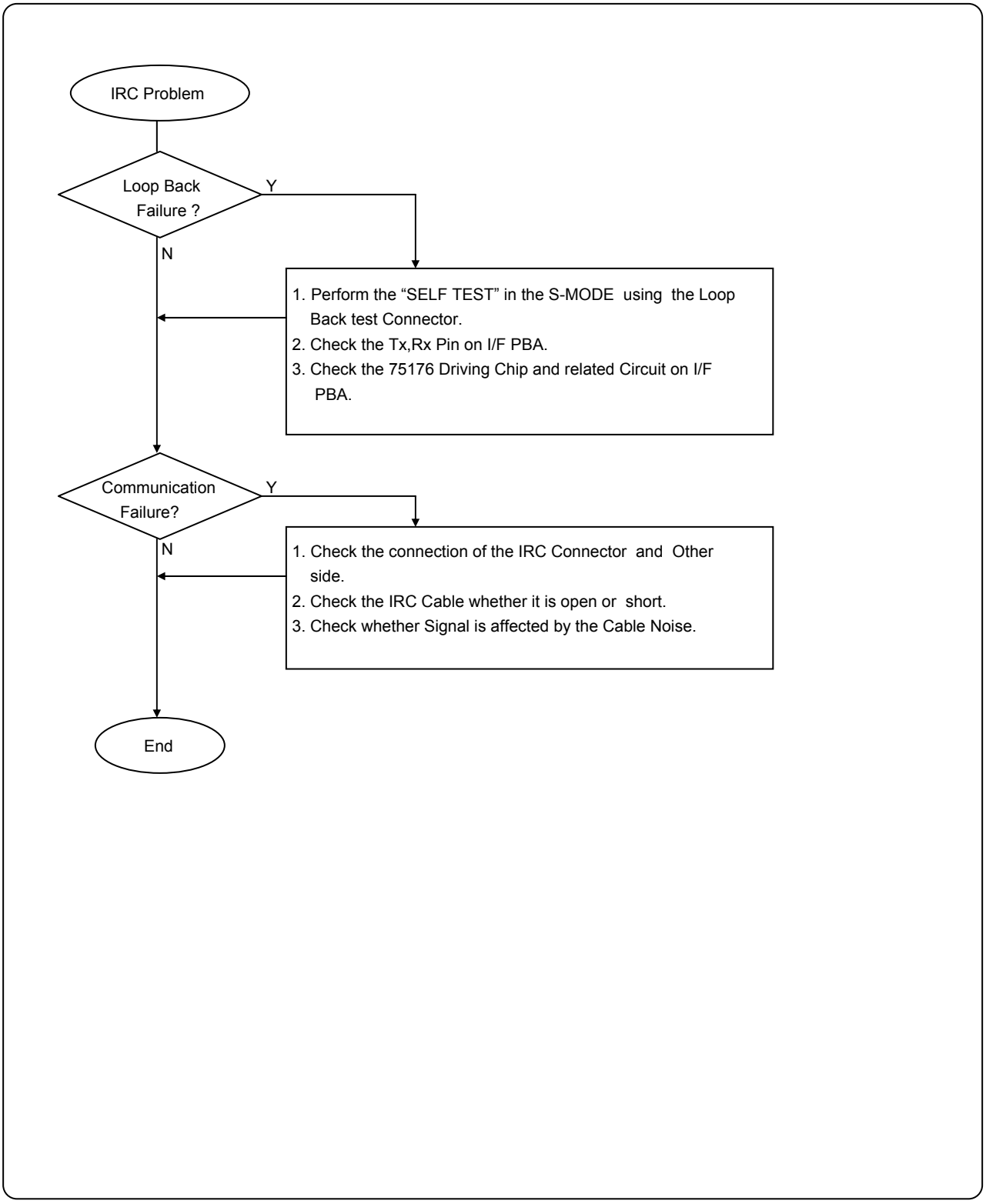
8-7 Drawer and RTC(Real Time Clock) Problem


Drawer Problem
Drawer Open Failure ?
Y
N
1. Check the Drawer Connector & Harness.
2. Check Drawer Signals on CPU (p8.4/P8.7).
3. Check the related circuit & Component D288 (Q4,Q5).
4. Check the Solenoid in the Drawer.
Compulsory Failure?
Y
N
1. Check the Compulsory Harness & Connector.
2. Check the micro switch in the Drawer.
End
RTC Problem
RTC Ok?
N
Y
1. Check the Clock (32.768KHz)
2. Check the Battery Voltage (VBU)
3. Check the RF5c15 & the related circuit. (Addr/Data bus, /CS signal)
End

8-8 RS-232C Serial Communication Problem


RS-232C Problem
Loop Back Failure ?
Y
N
1. Perform the “SELF TEST” in the S-MODE using the Loop Back test Connector.
2. Check the connection of the RS-232C Connector and Loop Back Connector.
3. Check the Txd,Rxd Pin on CPU.
4. Check the MAX232 Driving Chip and related Circuit on I/F PBA.
Communication Failure?
Y
N
1. Check the connection of the RS-232C Connector and Other side.
2. Check the I/F Cable whether it is open or short.
3. Check whether Signal is affected by the Cable Noise.
H/W Handshake Ok?
N
Y
1. Check the connection of the H/W handshaking Line and Other side
2. Check the I/F Cable whether it is open or short.
3. Confirm the H/W handshaking Protocol.
End

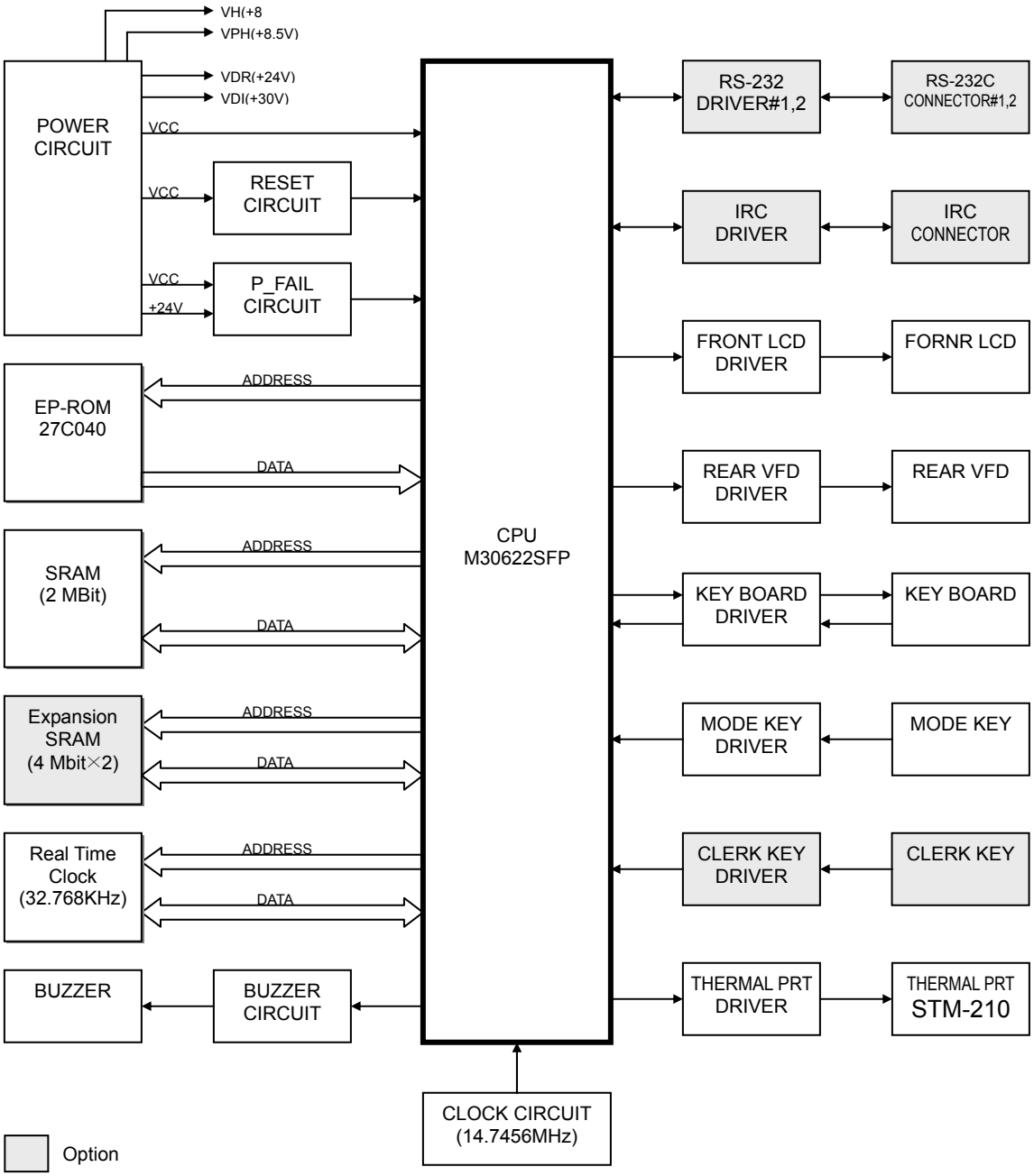
8-9 IRC Serial Communication Problem


IRC Problem
Loop Back Failure ?
Y
N
1. Perform the “SELF TEST” in the S-MODE using the Loop Back test Connector.
2. Check the Tx,Rx Pin on I/F PBA.
3. Check the 75176 Driving Chip and related Circuit on I/F PBA.
Communication Failure?
Y
N
1. Check the connection of the IRC Connector and Other side.
2. Check the IRC Cable whether it is open or short.
3. Check whether Signal is affected by the Cable Noise.
End

Memo

9 Block Diagram

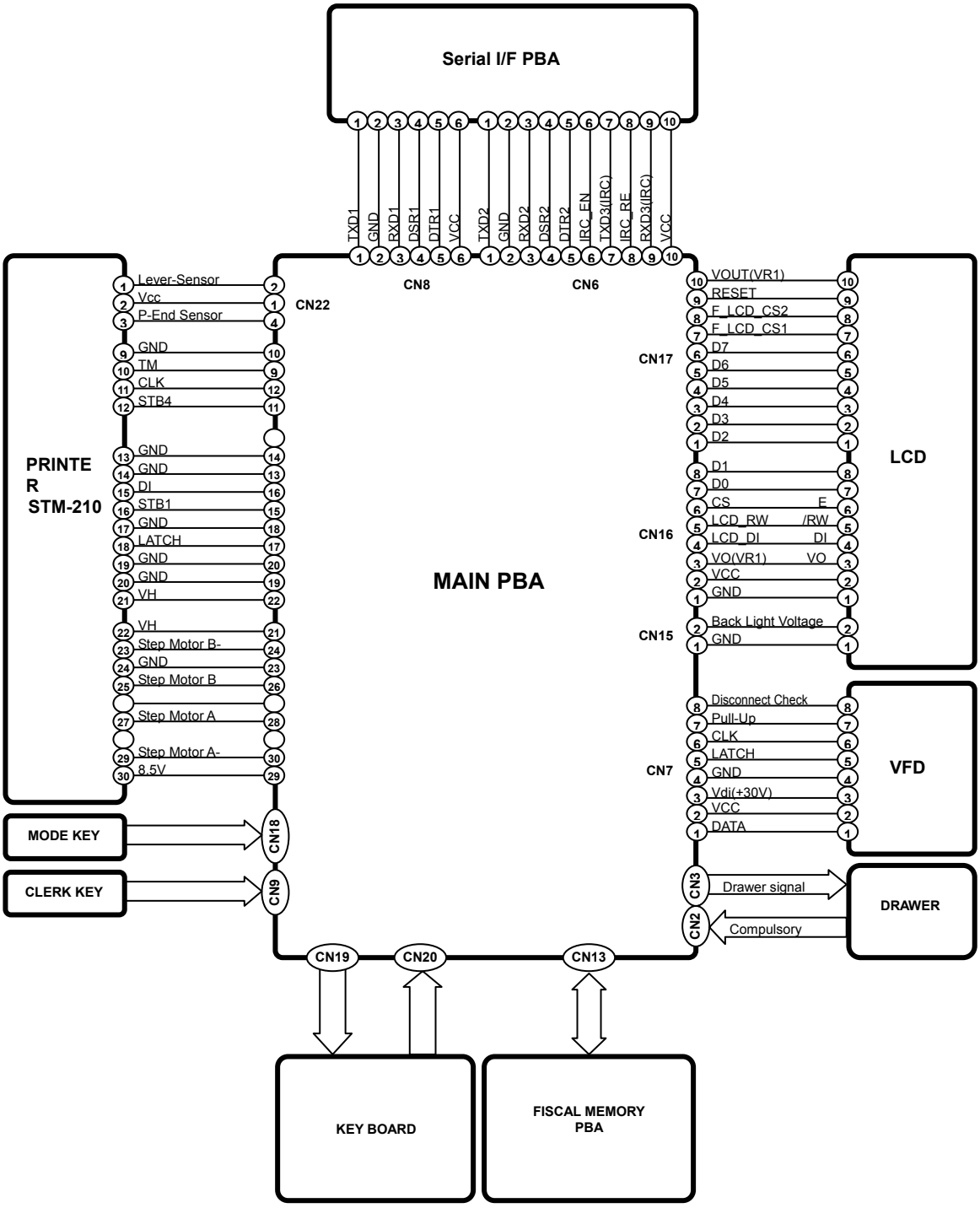
9-1 ER-650R



Memo

10 Wiring Diagram

10-1 ER-650R



Memo

11 Schematic Diagrams

[Schematics Sheet Content]

1. Main PCB Schematics.

1) CPU Block ---------- 11-2

2) Memory, Decoder Block---------- 11-3

3) Power Fail, Buzzer Block ---------- 11-4

4) Fiscal Block ---------- 11-5

5) Power Block ---------- 11-6

6) Rear Display, Drawer Block ---------- 11-7

7) Key Scan Block ---------- 11-8

8) LCD Display Block ---------- 11-9

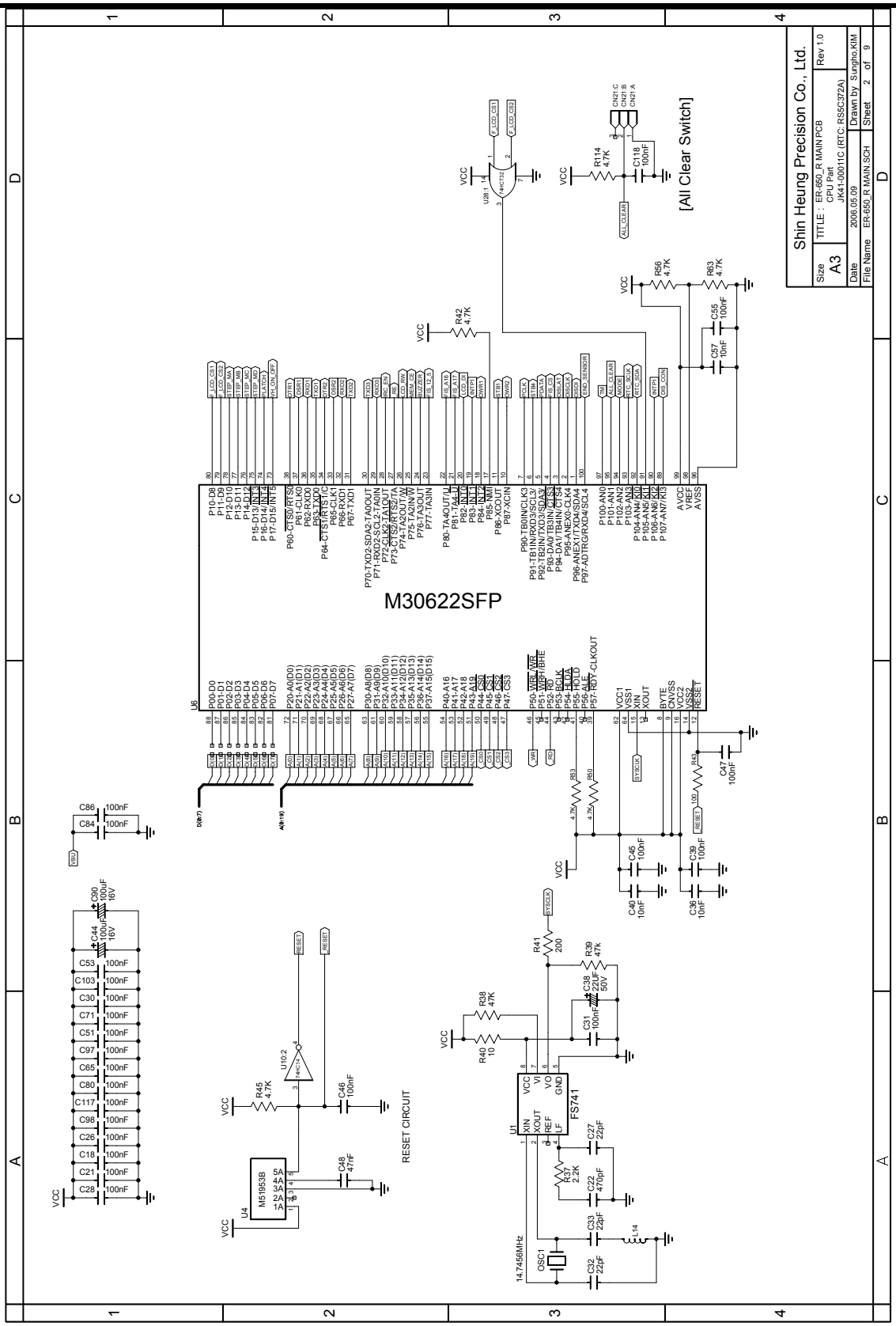
9) Printer Block---------- 11-10

10) Printer Connection Block---------- 11-11

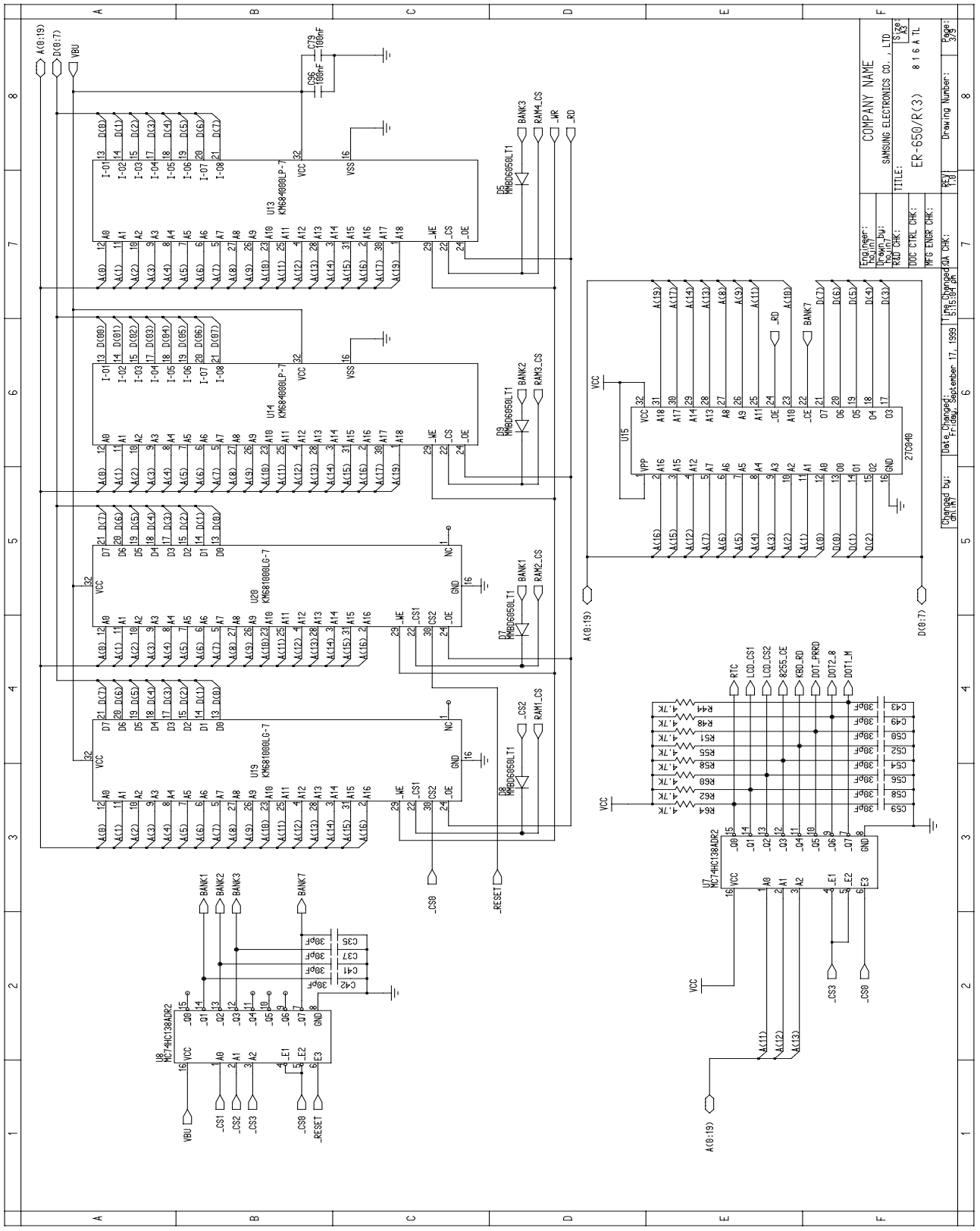
2. Interface PCB Schematics. ---------- 11-12

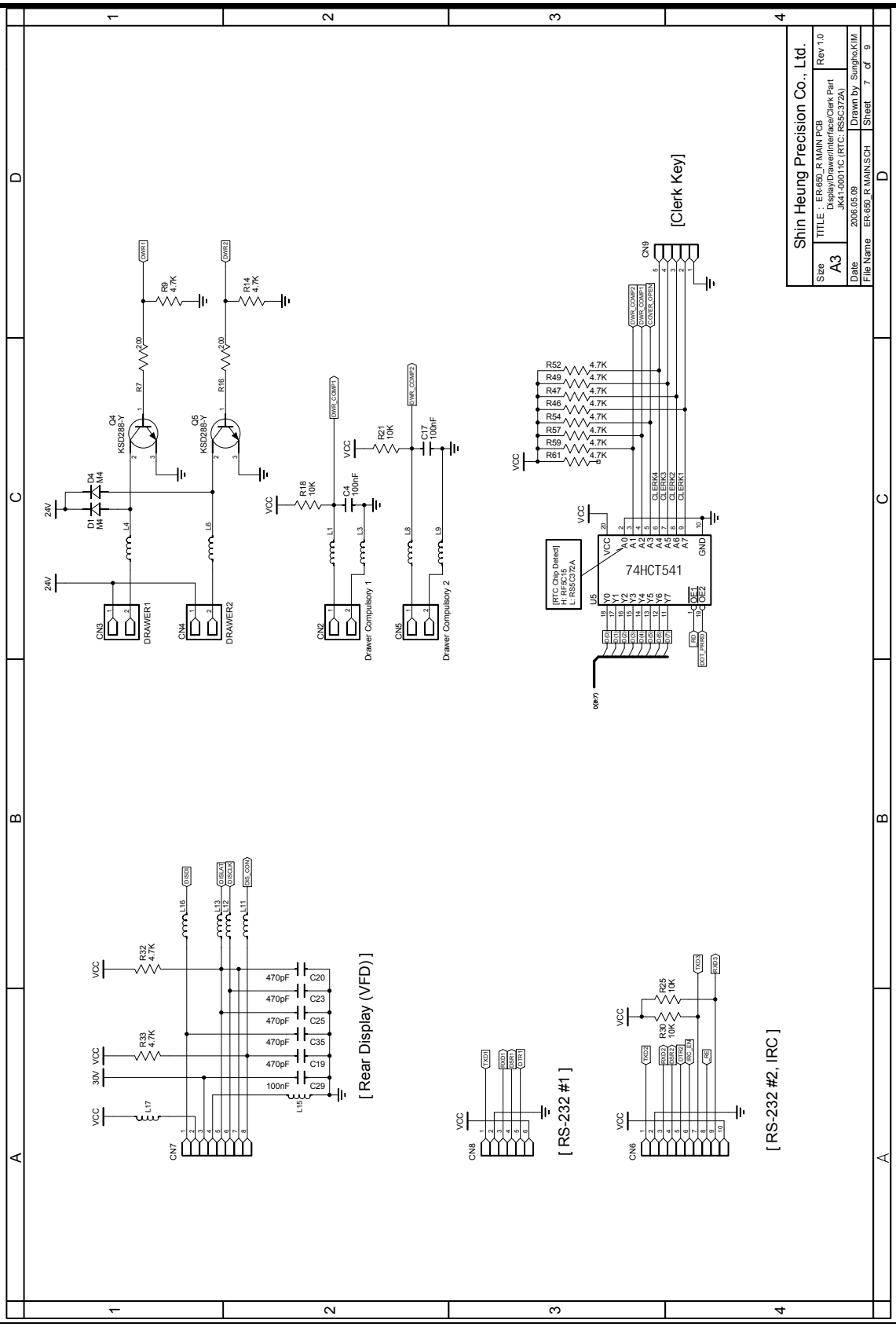
3. Rear Display PCB Schematics---------- 11-13

4. Fiscal PCB Schematics---------- 11-14

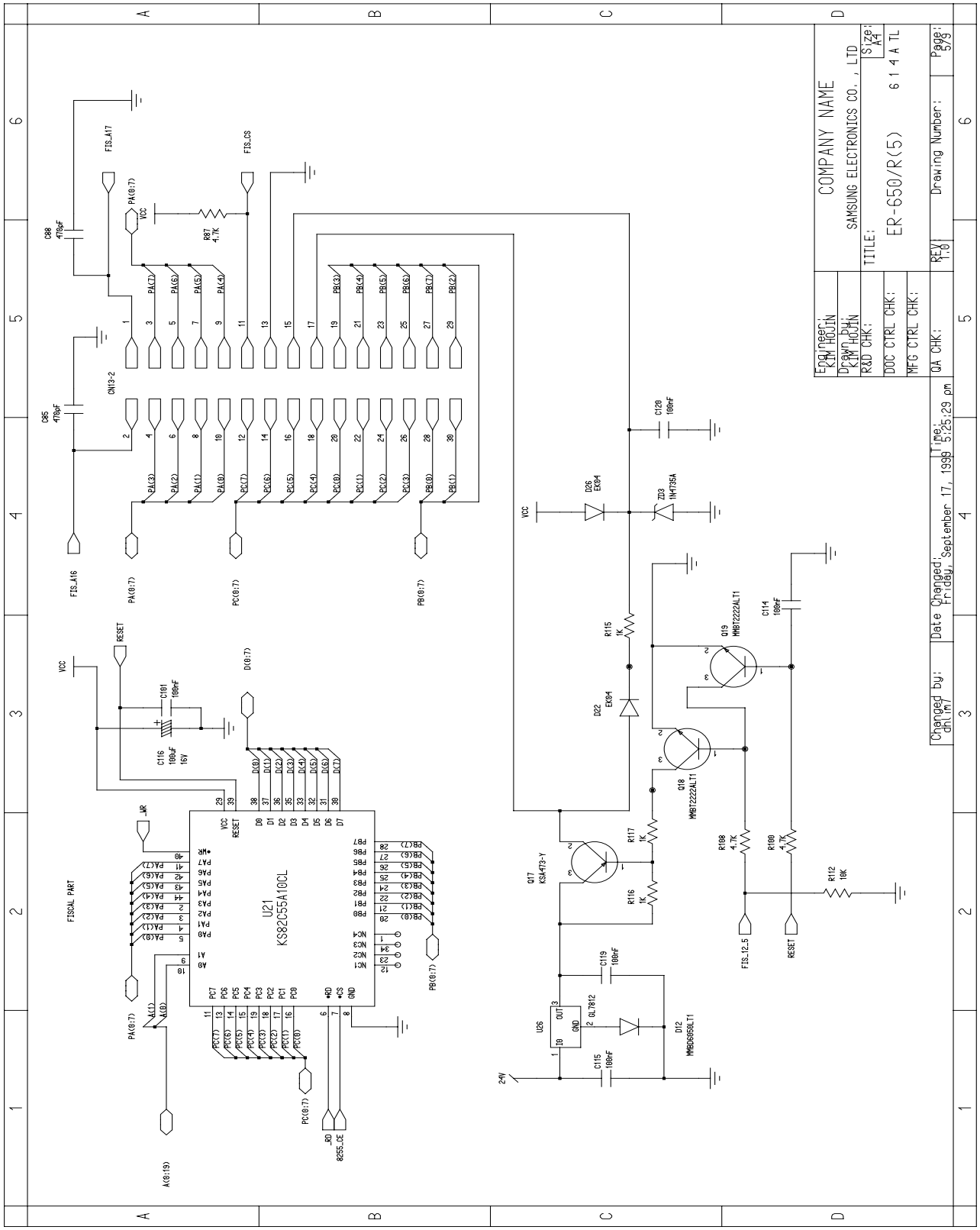

Shin Heung Precision Co., Ltd.
TITLE : ER-660_R MAIN PCB
CPU Part
JK41-00011C (RTC: RS5C372A)
Rev 1.0
Size A3
Date 2006.05.09
Drawn by Sungho.KIM
File Name ER-650_R MAIN.SCH
Sheet 2 of 9
M30622SFP
[All Clear Switch]
RESET CIRCUIT
FS741
M51953B
14.7456MHz

11-2 MEMORY PART

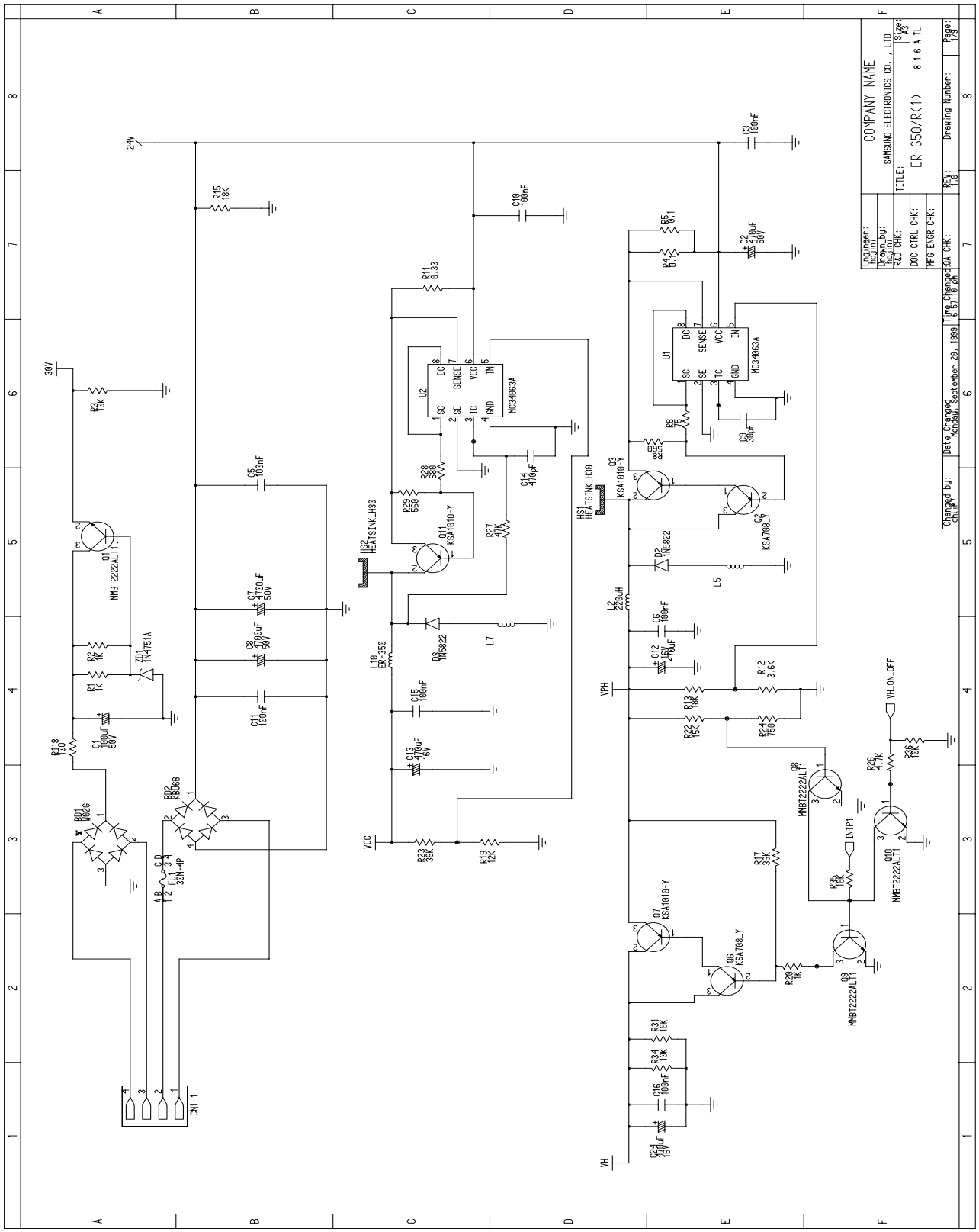



Shin Heung Precision Co., Ltd.
TITLE : ER-650_R MAIN PCB
Display/Drawer/Interface/Clerk Part
JK41-00011C (RTC: RS5C372A)
Rev 1.0
Size A3
Date 2006.05.09
Drawn by SunghoKIM
File Name ER-650_R MAIN.SCH
Sheet 7 of 9
[Clerk Key]
74HCT541
[RTC Chip Detect]
H : RF5C15
L : RS5C372A
DRAWER1
DRAWER2
Drawer Compulsory 1
Drawer Compulsory 2
[Rear Display (VFD)]
[RS-232 #1]
[RS-232 #2, IRC]

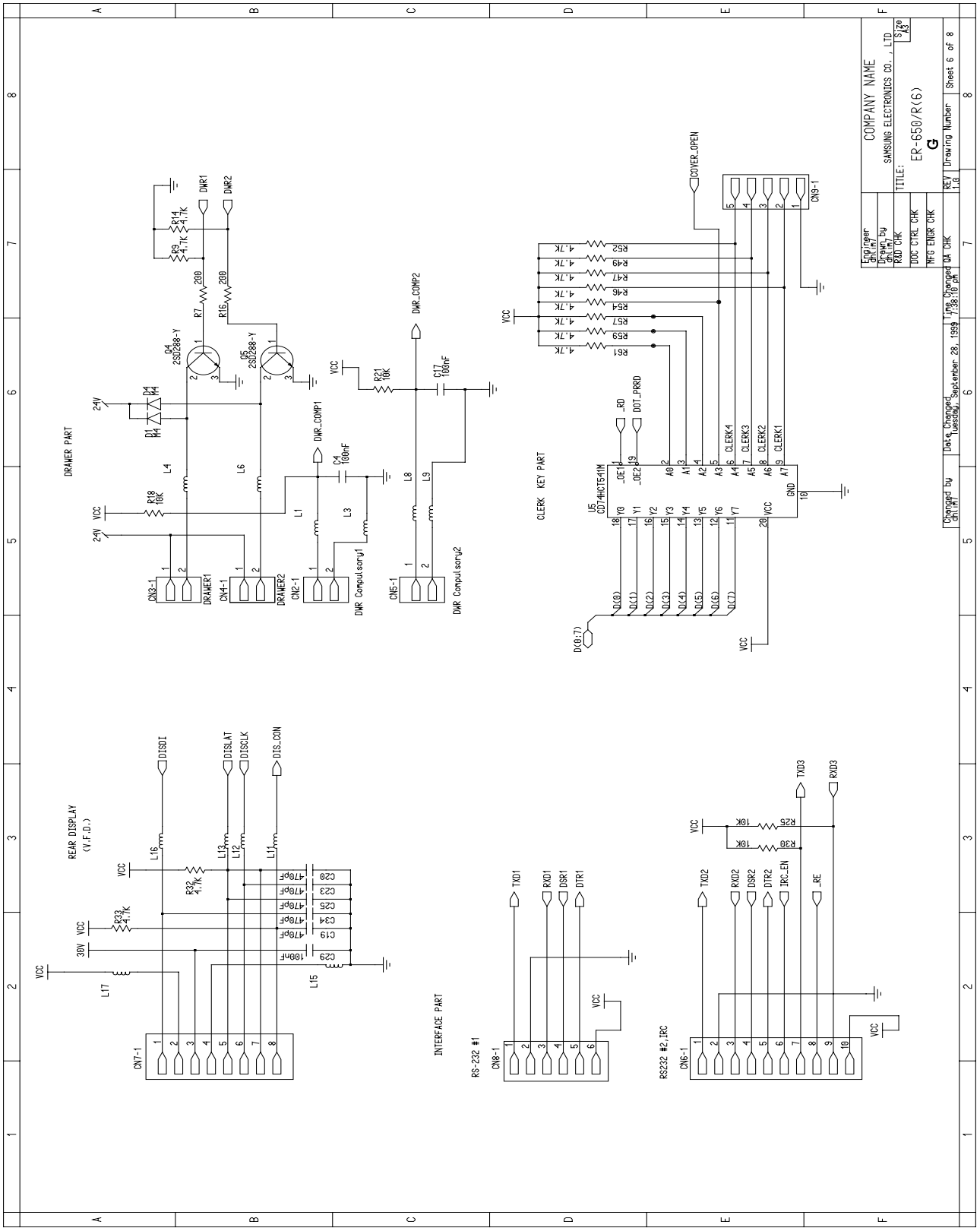
11-4 FISCAL PART



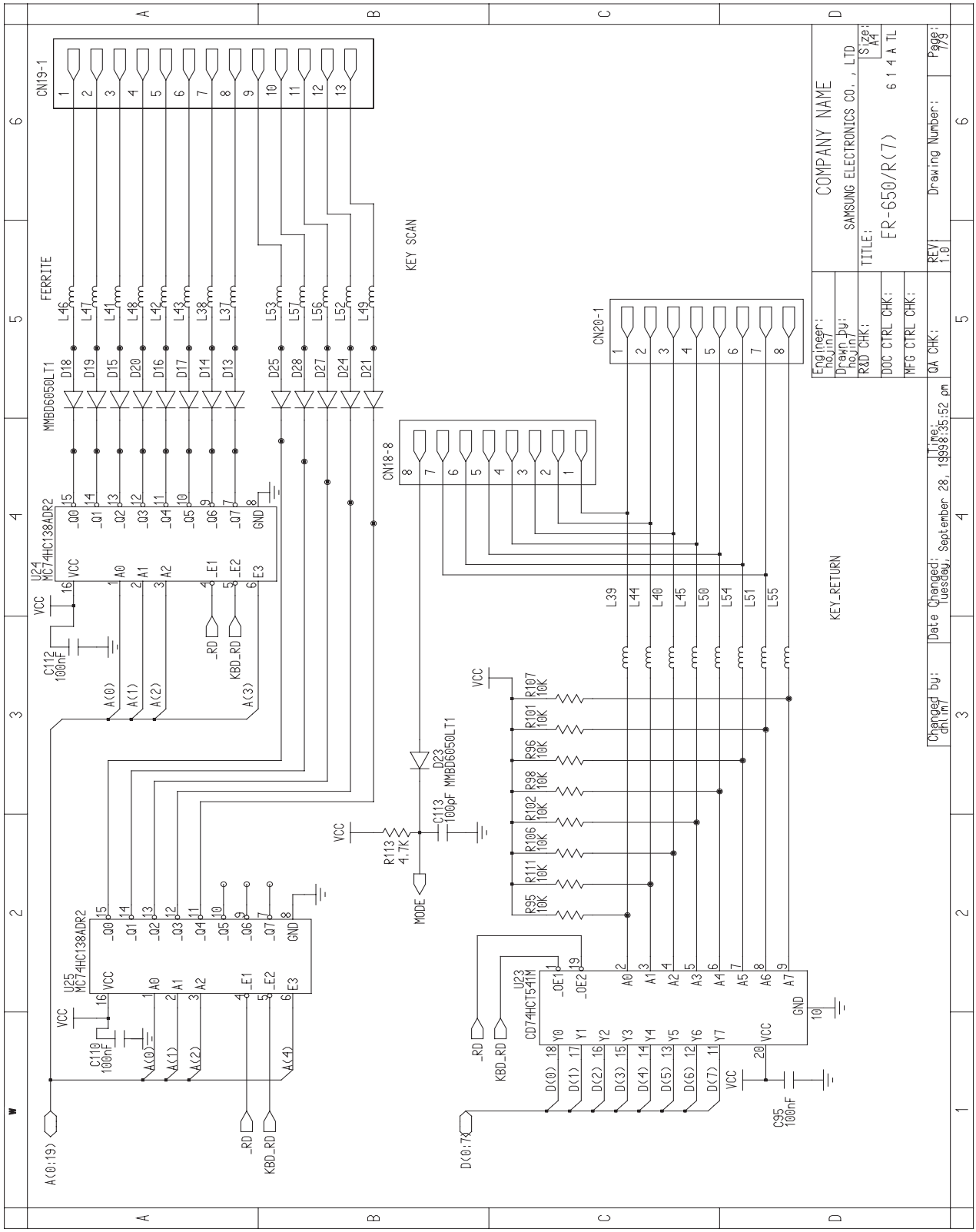
11-5 POWER PART



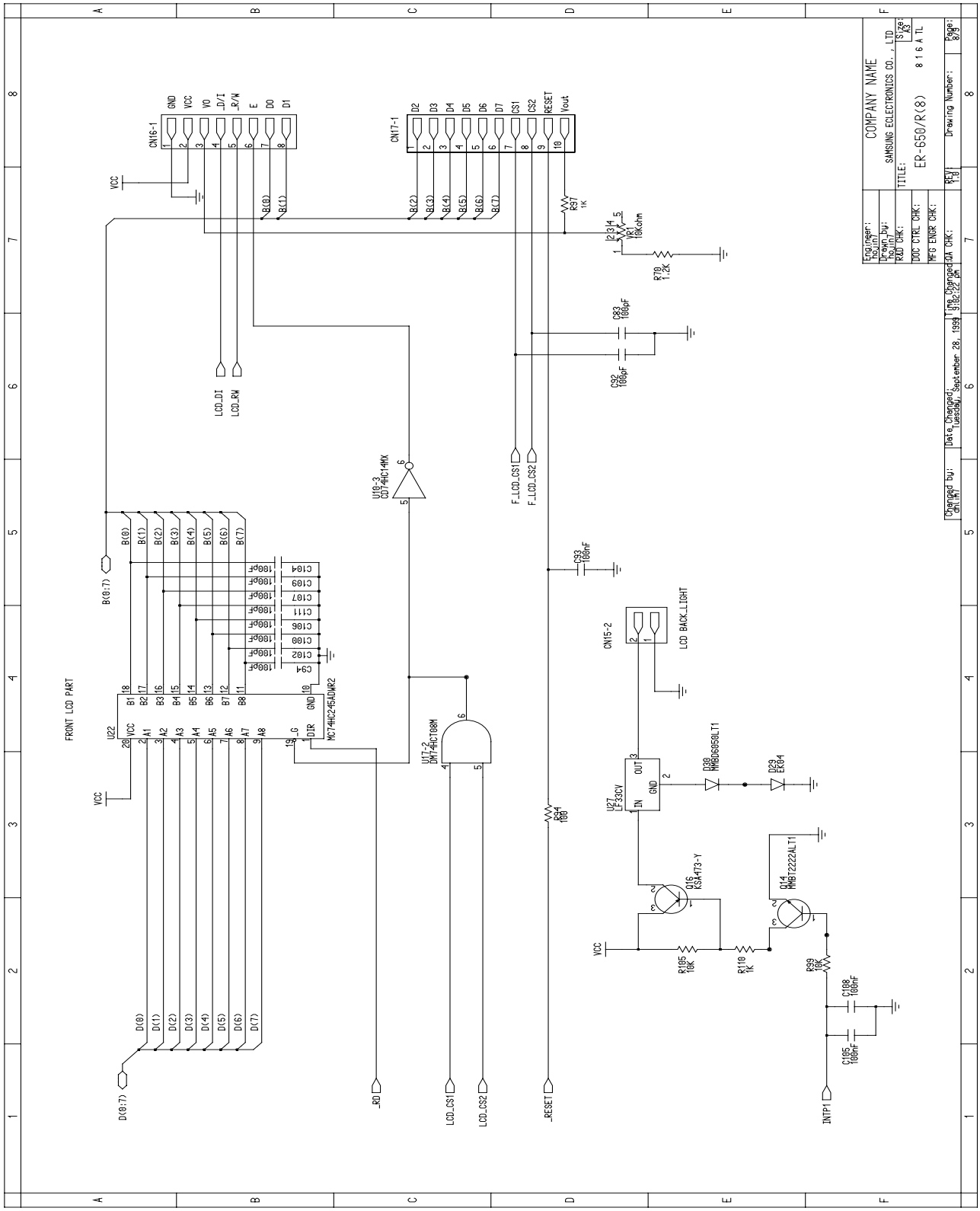
11-6 DRAWER / DISPLAY(VFD) PART



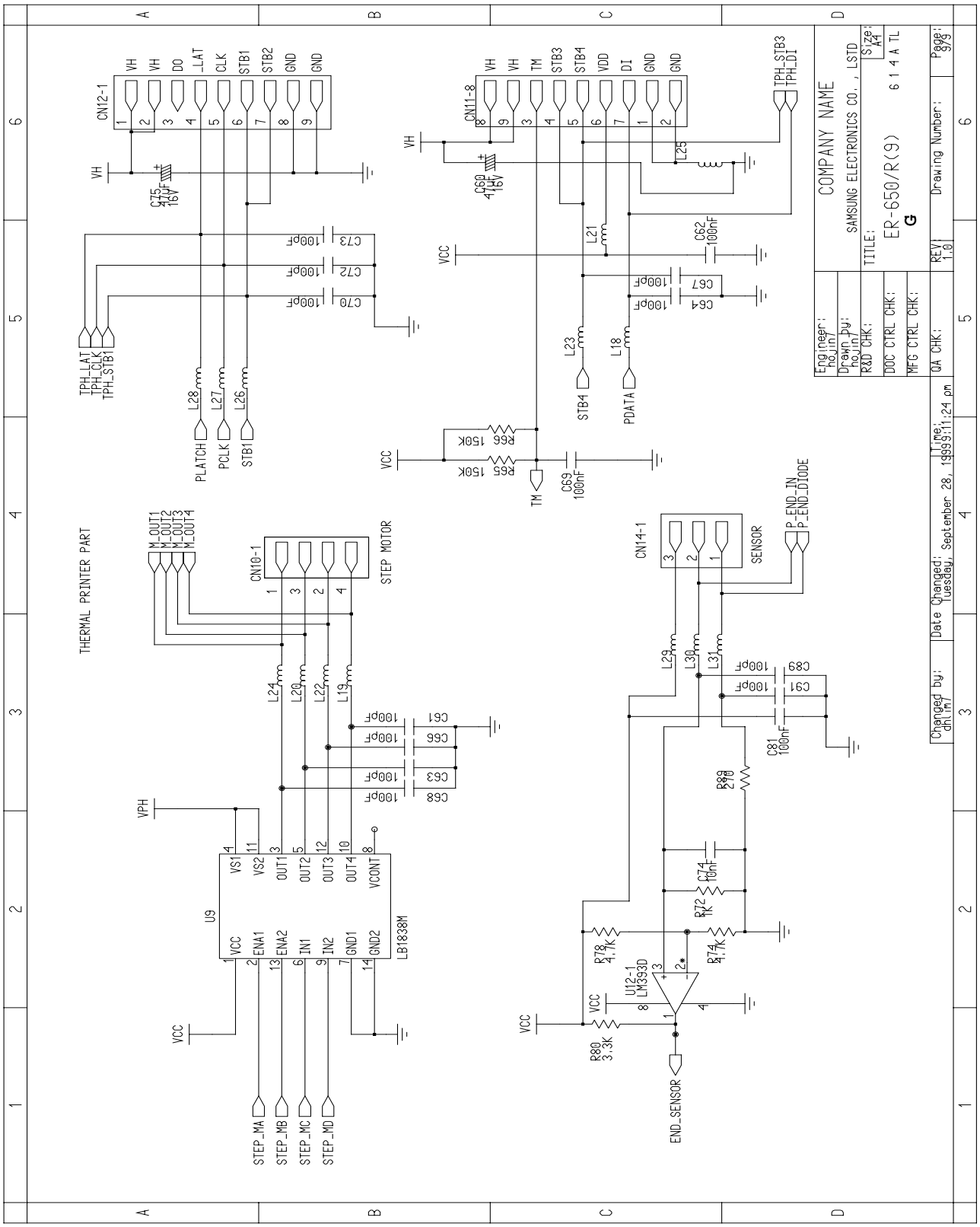
11-7 KEY SCAN PART



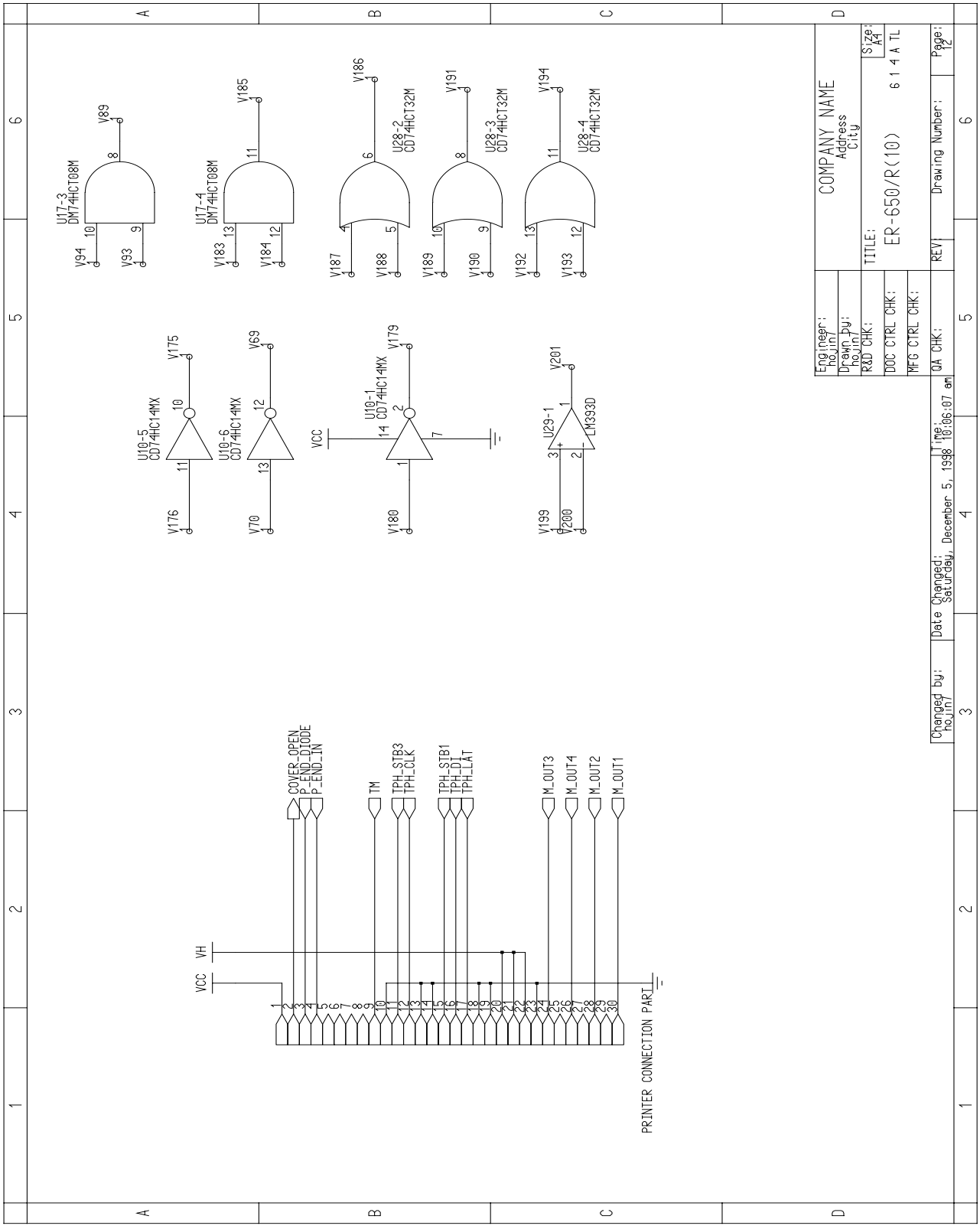
11-8 LCD DISPLAY PART



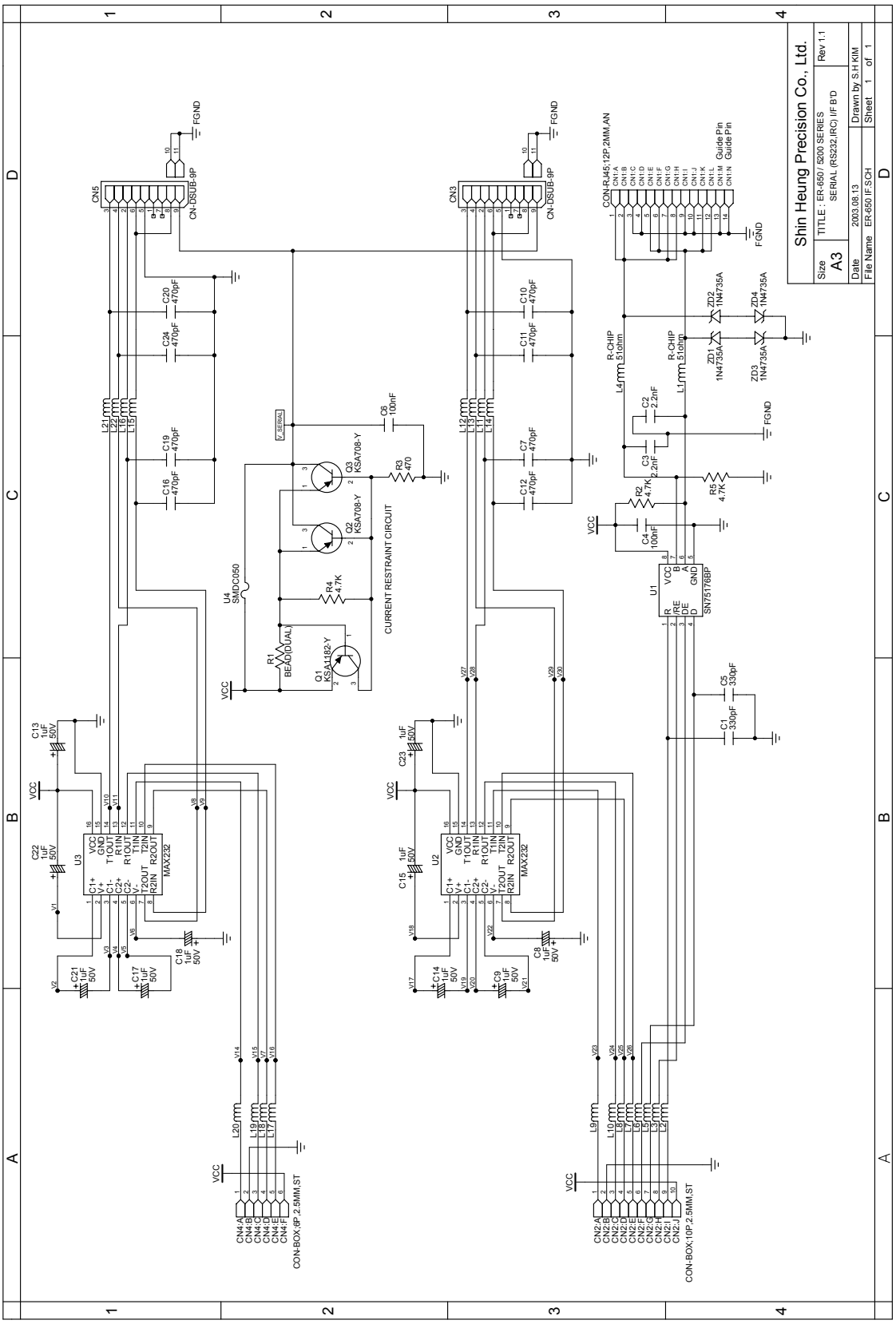
11-9 PRINTER PART



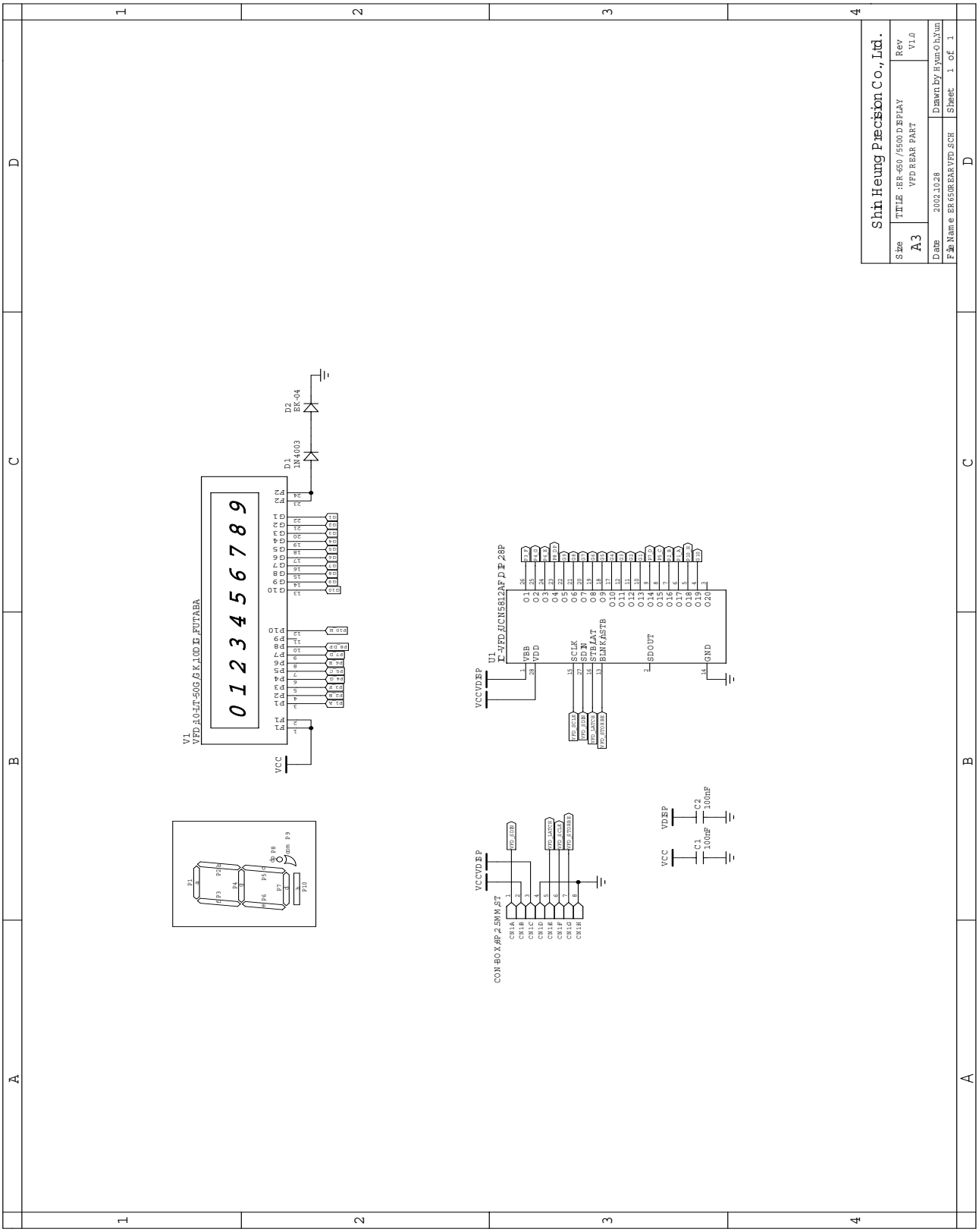
11-10 PRINTER CONNECTION PART



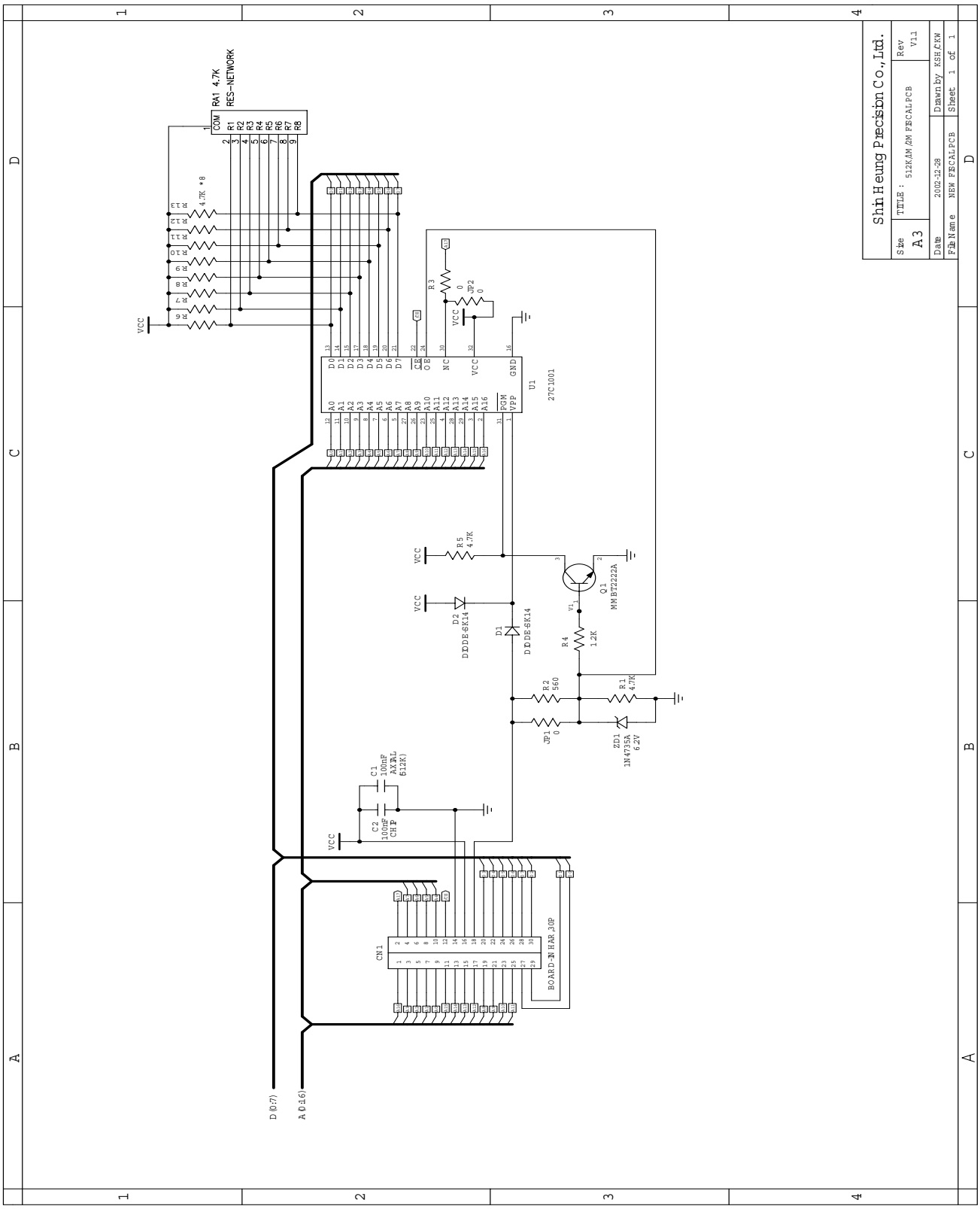
11-11 Interface PCB



11-12 Display (Rear)



11-13 Fiscal PCB



UPDATE LOG

Application Date	Page	Part #	Notes (Cause & Solution)	S/Bulletin

Use this page to record any special servicing information such as Service Bulletins or Supplements.
When possible, record changes to Code numbers directly on the actual Parts List.
Always records Service Bulletin numbers and Application Dates on this log to ensure that your data is always as current as possible.

SAM4S

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V2.0

Code No. : JK68-00061B